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ABSTRACT

A concept-based introduction to market segmentation is provided in this instructional module for undergraduate and graduate transportation-related courses. The material can be used in many disciplines including engineering, business, marketing, and technology. The concept of market segmentation is primarily a transportation planning technique by which the needs of a specific locale or population are systematically determined and compared to existing services within the same locale to identify unmet transportation needs. The unmet needs are used as the basis for targeting new or modified services. A series of steps for segmenting a region or population are outlined, and problems and issues that arise throughout the process are discussed. To illustrate the market segmentation approach, characteristics of various segments (e.g., commuters, transportation handicapped) are discussed, as well as major issues involved in transportation for different groups. Identifying market segments and their needs often involves data collection from various sources, including regional/local planning data and social service agencies. To assess existing services, operational characteristics may be studied as well as cost effectiveness measures. An eight-page bibliography is appended. (SW)

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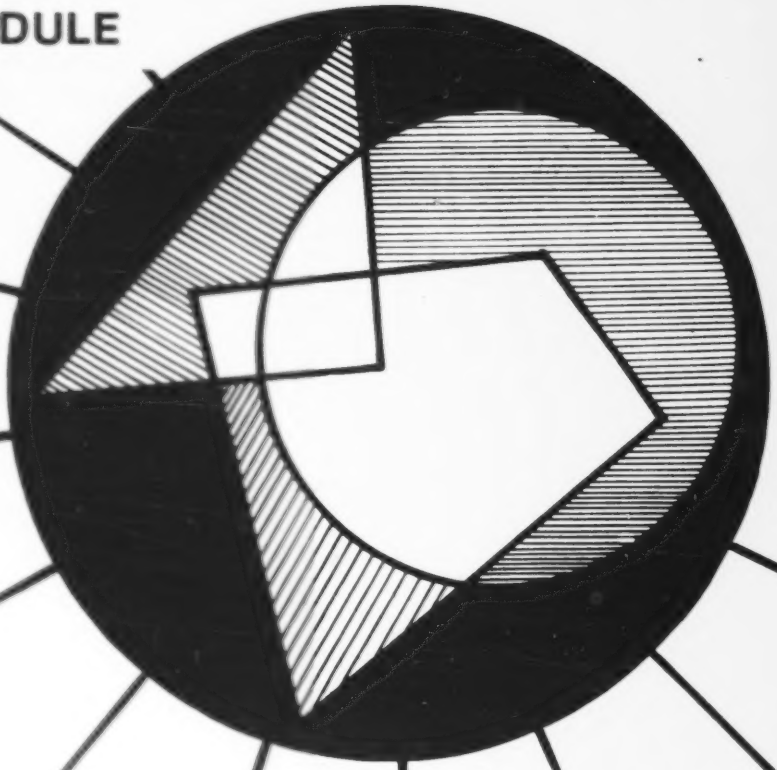
MARKET SEGMENTATION

INSTRUCTIONAL MODULE



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16. Abstract

This module is intended to provide a broad, concept-based introduction to the topic of market segmentation for use in both undergraduate and graduate transportation-related courses. The material is designed to be useful in many disciplines including engineering, business, marketing, and technology.

The concept of market segmentation is primarily a transportation planning technique by which the needs of a specific locale or population are systematically determined and compared to existing services within that same locale to identify unmet transportation needs. The unmet needs are used, then, as the basis for targeting new or modified services. This module outlines a series of steps for segmenting a region or population and discusses pertinent problems and issues which arise throughout the process. Key ideas are illustrated by the use of case histories and examples where possible.

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AN INSTRUCTIONAL MODULE

Prepared by
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Technology Education Program
West Virginia University

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Management Demonstrations

Urban Mass Transportation
Administration

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Market Segmentation

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TABLE OF CONTENTS

MARKET SEGMENTATION MODULE

Acknowledgements	ii
List of Figures	iii
List of Illustrations	iv
Professors Introduction	v
General Introduction	x
The Range of Market Segments	1*
Planning with Market Segmentation Analysis	11*
Data Gathering for Market Segmentation	27
Student Review and Investigation	34
Guidelines for Student Review	35
Analyzing Market Segments	36
Assessment of Existing Services	45
Analysis of Unmet Needs	56
Student Review and Investigation	62
Guidelines for Student Review	65
Targeted Design	67*
Reforms for Existing Systems	80
Conclusions on Market Segmentation	87
Student Review and Investigation	91
Guidelines for Student Review	93
Selected References	94
Appendix A: Bibliography	

* An asterisk has been placed after the page numbers if sections which we suggest you concentrate on if you only have time for a one-hour treatment of this material.

LIST OF FIGURES

1	Major Modes of Transportation to Work	3
2	Possible Market Segments of the Transportation Disadvantaged	8
3	Miami Beach Project - Simplified View of Bus Routes	25
4	Results of Commuter Attitudes Survey	32
5	Planning with Market Segmentation	37
6	Travel Survey	41
7	Sample Survey Results	43
8	Hypothetical Data for Single Subscription Bus	49
9	Comparison of Employee Ridesharing Feasibilities	63
10	Hypothetical Data for Single Demand-Responsive Van	64
11	Principal Groups in Transportation Decision-Making Process	70
12	Planning Process to Obtain Federal Funding	73
13	Marketing Strategies for an Existing Bus Service	82
14	Sample Ridesharing Promotional Brochure	84

LIST OF ILLUSTRATIONS

1	Comparison of Design Approaches	13-14
2	Transit and Paratransit Modes	16-20
3	Principal Groups in the Transportation Decision-Making Process	69
4	Transportation Planning Process	77

PROFESSOR'S INTRODUCTION

Project Purpose

Since the founding of the Service and Methods Demonstration Program (SMD) in 1974, the Urban Mass Transportation Administration (UMTA) has been intimately involved in the development and diffusion of innovations related to mass transportation. After a decade of experiments and demonstrations, valuable insights and techniques have emerged.

However, students graduating with transportation degrees are often unaware of much of the information which UMTA has developed. These modules were designed to introduce future transportation professionals and people with related interests to five areas where new ideas have proven important in the planning and management of public transportation systems. The topics are:

- Market Segmentation Planning;
- Paratransit;
- Transportation Brokerage;
- Rural Public Transportation; and
- Public Transportation Pricing.

The topics are defined at the end of this introduction and discussed in the General Introduction.

Description of the Modules

These modules are intended to provide a broad, concept-based introduction to each of the five topics for use in both undergraduate and graduate transportation-related courses. The material is designed to be useful in many disciplines, including engineering, business, planning, marketing, public administration, and technology.

One of the major findings of our phone interview in February 1983 was that professors want curriculum packages to be flexible. These modules were designed to be taught for one to three classroom hours. The module text may be used in a number of ways including uses as:

- Lecture notes;
- Student homework readings;
- Overhead transparencies from illustrations; and
- In-class reading and discussion.

All graphic materials labeled as illustrations are designed to be used as overhead projections while graphic materials labeled figures are designed for photocopying.

Professors should feel free to use these materials to supplement regular course design and materials in any way they wish. However, we have placed asterisks in the Table of Contents after sections which we suggest you concentrate on if you only have one hour to teach the module topic. At

the end of each of the three sections of the module, there are Student Review Questions based on the preceding material.

The topics of the five modules have a significant content overlap which is reflected in the module texts themselves. Therefore, some module sections are virtually repeated from one module to another. Professors utilizing more than one of the modules should make allowances for this in planning their presentations.

Persons wishing more detailed and in-depth information on particular topics should refer to the list of references at the end of each module. Sources published by UMTA may be located through the UMTRIS computer database on the DIALOG system or from the National Technical Information Service (NTIS). It may also be possible to obtain recent UMTA Technical Reports and a current bibliography from U.S. DOT/TSC, Service Assessment Division (DTS-64), Kendall Square, Cambridge, MA 02142.

Module Topic Definitions

Market Segmentation

Market Segmentation is a transportation planning approach which involves identifying groups in a market that are "homogeneous with respect to important criteria that influence their travel choices" (Nelson, TRR 823, p. 8).

This approach is associated with integrated mobility-based transportation planning and allows the consideration of a variety of solutions to individual travel needs and markets.

Paratransit

Paratransit refers to modes of passenger transportation which are on a continuum between the private automobile and conventional transit. They are usually available to the general public and able to operate over the street and highway system (Kirby, 1974, pp. 1, 9). Paratransit generally refers to modes such as dial-a-ride, shared-ride taxi, jitneys, vanpools, and so on.

Transportation Brokerage

The transportation broker identifies the transportation needs and demands of various market segments and then matches these needs with available transportation resources. The broker also may resolve barriers to innovative transportation arrangements and implement those arrangements through contracts with social service agencies, employers and private operators. Brokerage is a concept which highlights many of the roles a transportation manager can undertake to provide mobility comprehensively and cost-effectively.

Rural Public Transportation

Rural public transportation involves systems in rural and small urban areas with populations under 50,000 people. Public transportation services in rural areas have often been provided solely by social service agencies serving their clients. New federal programs have facilitated the development of rural systems open to the public but strong local involvement and creativity are needed to create and support such services.

Public Transportation Pricing

Public transportation pricing systems are composed of fare structures and fare collection mechanisms. They are based on consideration of the system users, politics, funding sources, system costs, and system service characteristics. Planning pricing systems involves the balancing of many complex demands. Higher fares often lead to increased revenue generation but they can decrease ridership thereby lowering the social benefits of transit service. Complicated fare systems can promote equity among riders but they can make fares difficult to collect efficiently.

GENERAL INTRODUCTION

Historically, mass transportation in the United States was almost always provided by private, profit-seeking enterprises. The public's interest was usually protected through regulation by a public utility commission. Such commissions controlled entry into the transit business, fares, and the types of service offered.

As the number of automobiles and the quality of roads increased, mass transit ridership suffered a major decline. At the end of World War II, 37% of commuters were riding to work on public transit. By 1979, this figure had fallen to 6%; and there was an automobile for every two Americans. An expanding economy permitted many urban residents to purchase cars and suburban houses.

Mass transportation did not adapt to these changes, and private enterprise gradually withdrew from providing such services. The federal government began to provide financial assistance for transit systems which permitted local governments to take control of them. In the 1960s, the federal government initiated operating subsidies to help curb deficits.

As federal assistance for transportation systems grew, it became evident that the government was spending

increasing sums of money to support transportation systems which were not adjusting to changing conditions. Research into alternative methods of providing public mobility was a necessity. In 1964 Congress created the Urban Mass Transportation Administration (UMTA) to "research, develop, and demonstrate projects in urban mass transportation."

In 1974 UMTA created the Service and Methods Demonstration (SMD) Program to promote the development and widespread adoption of innovative transit services and transportation management techniques. Some of the areas in which UMTA has facilitated major changes are bus and rail equipment design, automation, paratransit, brokerage, integrated planning, and other management innovations.

These modules were designed to introduce students of transportation to information on five topics: market segmentation planning, paratransit, transportation brokerage, rural public transportation, and public transportation pricing. The information in the modules is based on the results of numerous UMTA-funded demonstration and research projects related to these topics. The five topics are introduced on the following pages.

New Directions

Market Segmentation

Public transportation today involves a variety of transportation modes with varying costs and characteristics. A transportation planner must have new planning tools to cope with the complex array of possible systems.

Instead of focusing on transportation systems, the planner should begin by studying the actual mobility needs of the people to be served. Needs-based transportation planning is the only way to ensure services that are fully used and cost-effective. New or modified services which meet the needs of certain groups must then be marketed to inform people of the service's benefits for them.

There are four basic steps to the Market Segmentation planning approach:

1. Market Segmentation Analysis
2. Assessment of Existing Services
3. Analysis of Unmet Needs
4. Targeted Design

Paratransit

Paratransit refers to any public transportation mode which falls on the continuum between the large fixed-route systems (bus, train, etc.) and the private automobile. This includes demand-responsive modes such as Dial-A-Ride and ridesharing modes such as vanpools. Paratransit

systems are designed to be flexible, cost-effective,and targeted to specific needs, but they cannot move large numbers of people on a single route as cheaply as mass transit systems.

Paratransit is being used to serve commuters, the handicaped, the elderly, and others. It works well in low-density or special needs situations where conventional mass transit would be too expensive. Paratransit also can work well as a feeder service for a conventional system.

Brokerage

Suppose a city decides to provide its elderly with a partially subsidized door-to-door service. It would be very expensive to buy cars, maintain them, hire drivers, and so on. It is cheaper to contract with local taxi companies who already have facilities and a workforce. The taxi company provides the service, the elderly give the drivers tickets (provided by the broker) good for part of each fare, and the city buys the tickets back from the taxi company.

In such a case, the transportation planner acts as a broker who matches transportation needs with available services. Rather than operating as a carrier, the transportation broker is primarily concerned with increasing people's mobility with equitable and cost-effective services.

Brokerage is useful in many areas of transportation management, particularly in the provision of flexible, low-cost paratransit services. The concept of brokerage highlights the new types of roles transportation managers can undertake in today's complex operating environments.

Rural Public Transportation

Rural areas are characterized by sparse populations, often difficult road conditions, and limited resources, yet people in rural areas need mobility for access to jobs, shopping and health care. Most rural people either own autos or rely on informal networks based on them. Public transportation in rural areas has usually been provided solely by social service agencies serving their clients. Federal funding has facilitated the development of systems open to the public but strong local involvement and creativity are needed to create and support such services.

Rural systems have employed many innovations including all types of cooperative arrangements, extensive use of volunteers, and experiments with non-traditional vehicles such as school buses and postal vehicles. Rural public transportation fills pressing needs but due to the difficulties of arranging and financing it, strong local support and creativity are essential.

Public Transportation Pricing

Public transportation pricing systems are composed of fare structures and fare collection mechanisms. Fare structures deal with how much system riders pay to use the service while collection mechanisms range from simple cash fares to complex postpayment and user-subsidy ticket systems.

Planning the pricing of a public transportation service is an integral part of planning the overall transportation system. Fares and collection methods are based on factors such as who the system users are, political considerations, sources of funding, costs of the system, and system service characteristics. Planning pricing systems involves the balancing of many complex demands.

Higher fares often lead to increased revenue generation but they can decrease ridership thereby lowering the social benefits of transit service. Complicated fare systems can promote equity among riders by permitting, for example, discounts for the elderly. However, too many complications can make fares difficult for bus drivers to collect efficiently.

THE RANGE OF MARKET SEGMENTS

The purposes of this section are:

- To illustrate the market segmentation approach by discussing the characteristics of various segments.
- To acquaint the reader with major issues involved in transportation for different groups.

Market Segmentation is an approach to transportation planning by which basic marketing principles are applied to the specific transportation needs of people in order to better target public expenditures. The concept of market segments comes from the need to analyze a wide spectrum of consumers or users to determine sub-groups which share similar characteristics or needs. By analyzing the needs of various market segments, transportation planners are better able to plan and implement systems which are efficient and useful.

A major group of people with similar travel characteristics are those commuting to work. The next section will discuss several broad market segments in more detail and will detail some of the factors that influence people's travel choices. Within each market segment there

are many sub-groups with their own specific needs. This module will discuss how the systematic study of such segments can be used in planning transportation systems.

Commuting to Work

People commuting to and from work in America make up a visible and significant group of transportation users. Therefore, commuters are a significant transportation market segment. Employers and employees have a high level of concern about the reliability and punctuality of transportation to work. Factors such as speed, cost, and comfort have a strong influence on commuter travel choices. One result of these concerns is that most commuters choose to commute in their private automobiles.

In 1979 over 85% of commuters drove to work and 68% drove alone. Only 6% used public transportation. Thus, the predominant mode of travel to work was the private automobile. (See Figure 1).

Commuters and Peak Congestion

Many workers work from nine to five o'clock in centrally located areas such as urban centers, industrial sites, and commercial areas. Because of the high number of

Figure 1. Major Mode of Transportation to Work (1979).

MODE	UNITED STATES TOTAL	
	Number (000)	Percent
Total	54,104	100.0
Automobile or truck	46,368	85.7
Drive alone	37,129	68.6
Automobile	29,382	54.3
Truck	7,747	14.3
Carpool	9,240	17.1
Automobile	7,644	14.1
Truck	1,596	2.9
Public Transportation	3,219	5.9
Bus or street car	1,922	3.6
Subway or elevated	901	1.7
Railroad	323	0.6
Taxicab	73	0.1
Bicycle	309	0.6
Motorcycle	375	0.7
Walk only	2,117	3.9
Other means	256	0.5
Work at home	1.261	2.3
Not reported	200	0.4

SOURCE: U.S. Department of Commerce, Bureau of Census, Current Population Reports Special Studies Series P-23, No. 122. Journey to Work in U.S., 1979.

workers travelling at the same time and often in the same direction, peaks in transportation use occur during the morning and afternoon commuting, or rush, hours. These peaks are characterized by daily traffic slowdowns at regular times involving large numbers of commuter-carrying vehicles.

> Activity centers or trip generators are frequent travel destinations. Some examples are hospitals, factories, and central business districts.

A factor which adds to this road congestion is the amount of excess capacity represented by solo drivers in multipassenger automobiles. Conditions which tend to encourage automobile use include:

1. The inconvenience or non-availability of public transportation in the suburbs;

2. Widespread subsidization of employee parking by employers. (Employers provide free parking to workers despite the expense, but do not similarly subsidize employee use of public transportation); and

3. The traditional convenience and independence associated with private automobile use.

Peak congestion caused by the wide use of the private automobile to commute to work is a serious problem for all workers whether they drive or ride. Congestion makes any trip, whether in bus, auto, or van, less pleasant, less reliable, and slower. Traffic delays caused by congestion cost millions of dollars in lost work time, increased travel costs, and environmental deterioration.

The Transportation Handicapped

The term transportation handicapped refers to those persons whose physical or mental condition makes it difficult for them to use conventional transit. It has been estimated that over 13 million Americans experience more than average difficulty in using public transportation due to inabiltiy to access and board a transit vehicle. While nearly a third of these people drive cars, the rest need some form of specialized transportation to get around.

The transportation handicapped present unqiue mobility problems. Different handicaps necessitate different facilities. The blind and deaf can walk but may require orientation aid. Other handicapped people, such as those in wheelchairs, have no orientation problems but cannot climb stairs or use escalators.

While workers generally have a choice of travel modes, there are other segments of the population which display a greater dependence on public transportation. Commuters

can represent demand, or a market, for specific transportation services, but some transportation handicapped people need specially designed services if they are to travel at all. Managers of public transportation systems must plan to meet both needs and markets for their services.

The transportation handicapped are often dependent on public transportation to secure food, medical attention, work, and other basic necessities. Their varied and unique needs must be considered in transportation planning. Despite the difficulties of generalizing, it has been shown that many transportation handicapped people need door-to-door service, yet tend to be flexible as to when their trips take place. A dial-a-ride, or demand-responsive, system is often a practical way to meet many of these needs.

The Transportation Disadvantaged

The term transportation disadvantaged refers to people who have no reasonable transportation alternative for a given trip at a given time. They do not have access to either an automobile or a regular public service for reasons of location, cost, or convenience. As many as 40% of the American people are regularly part of this group which includes the young, the poor, non-drivers, and many elderly people.

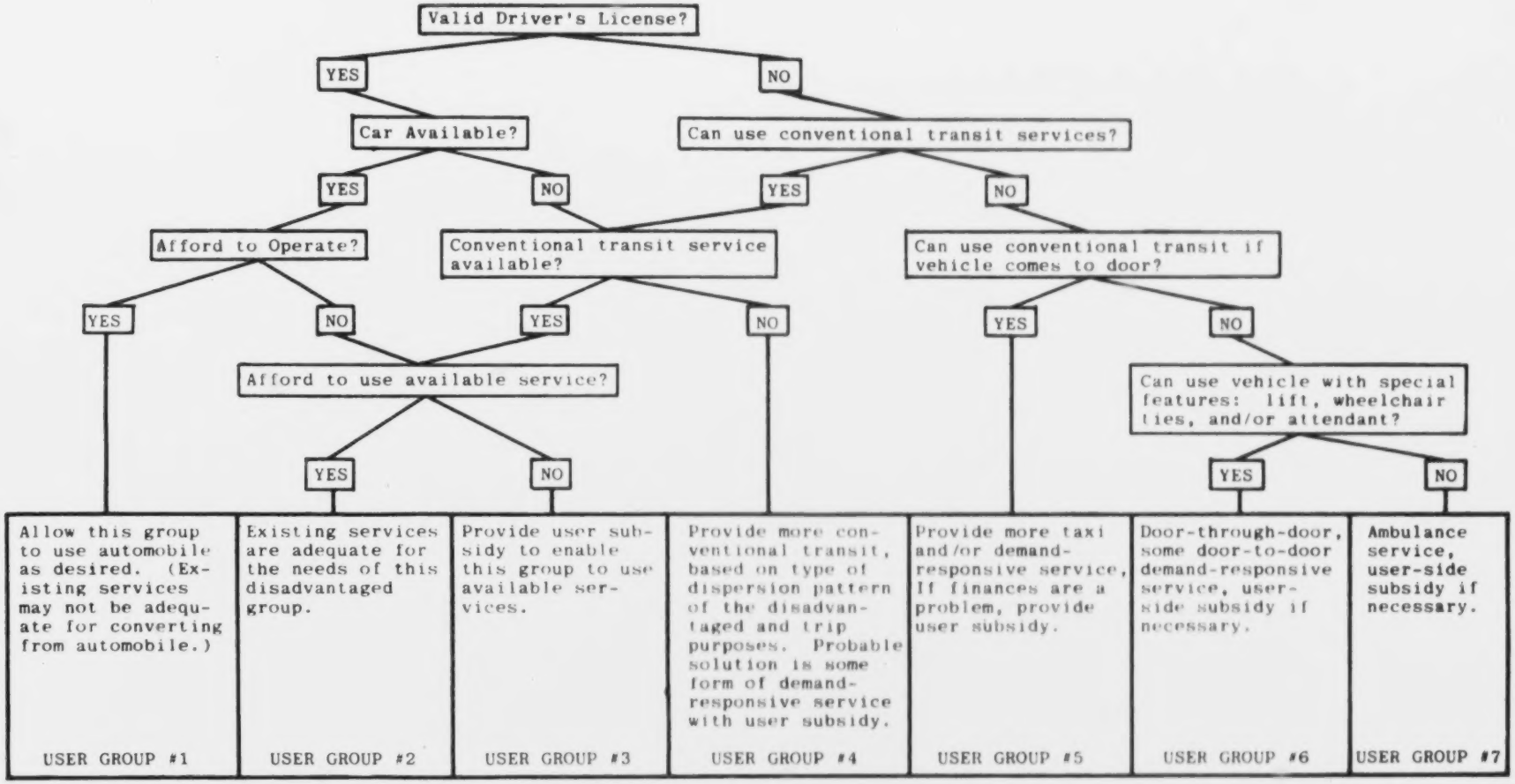
Some members of this segment are only transportation disadvantaged at certain times. For example, the spouse of a worker who commutes in the family car may be in this group during the day but not the evenings. In a similar vein, other people without cars may have convenient bus or train service for part of the day near their homes.

Available public services are not usually able to carry every person regularly and promptly to every location. Such a bus or train system would be extremely expensive. Therefore, the transportation disadvantaged often must sacrifice convenience, comfort and speed to travel where they wish. This limits their opportunities for employment and other activities.

The transportation disadvantaged have a wide range of trip purposes. Their ability to pay standard transit fares varies. Many could pay standard transit fares if the services they needed were available. Thus, the transportation disadvantaged represent a large potential ridership for any new or improved transportation service.

Table 2 on the following page shows one way in which the transportation disadvantaged and the transportation handicapped may be categorized into smaller market segments for transportation planning purposes. Under each group is a description of possible services that meet their specific needs. Of course, one specific service could be used for a number of these subgroups depending on their needs and locations.

Figure 2. Possible Market Segments of Transportation Disadvantaged.


Valid Driver's License?
YES
NO
Car Available?
Can use conventional transit services?
YES
NO
YES
NO
Afford to Operate?
Conventional transit service available?
Can use conventional transit if vehicle comes to door?
YES
NO
YES
NO
YES
NO
Afford to use available service?
Can use vehicle with special features: lift, wheelchair ties, and/or attendant?
YES
NO
YES
NO
Allow this group to use automobile as desired. (Existing services may not be adequate for converting from automobile.)
USER GROUP #1
Existing services are adequate for the needs of this disadvantaged group.
USER GROUP #2
Provide user subsidy to enable this group to use available services.
USER GROUP #3
Provide more conventional transit, based on type of dispersion pattern of the disadvantaged and trip purposes. Probable solution is some form of demand-responsive service with user subsidy.
USER GROUP #4
Provide more taxi and/or demand-responsive service, If finances are a problem, provide user subsidy.
USER GROUP #5
Door-through-door, some door-to-door demand-responsive service, user-side subsidy if necessary.
USER GROUP #6
Ambulance service, user-side subsidy if necessary.
USER GROUP #7

SOURCE: National Cooperative Highway Research Progam Report #209.

Rural Users

Rural people often have a different mix of travel patterns than urban residents. Trips for food or medical attention often cover long distances and require considerable travel time. Usually, rural workers must commute in cars, often over long distances. Rural residents usually depend on the private automobile, and they often create informal networks to help each other with necesary trips.

Rural areas are characterized by low population densities, often difficult travel conditions, and limited resources. For these reasons, many low density suburban and small town areas cannot support conventional transit service. Historically, public transportation in rural areas has been provided as a byproduct of social service programs which are usually targeted at specific client groups within the community. Transportation disadvantaged and transportation handicapped people in rural areas who are not served by a particular agency often have serious mobility problems.

Summary

This section has summarized the primary characteristics of some major transportation user groups. In planning on a local basis, it is important to obtain more specific information on the numbers and travel characteristics of groups who represent either need or demand for public transportation services. The next section will illustrate why studying market segments is a critical first step in the transportation planning process.

PLANNING WITH MARKET SEGMENTATION ANALYSIS

The purposes of this section are:

- To define market segmentation and its major use in transportation;
- To establish the necessity of marketing transportation services; and
- To clarify the role of market segmentation analysis in the transportation planning process.

Historically, the need to "market" transportation services did not exist. New transit systems were designed based on population density, activity centers, and travel corridors. In other words, system designers would build systems where people worked and shopped, and where the busiest roads were. Historically, large numbers of people used these systems which operated over fixed routes for relatively short distances.

> A travel corridor is a heavily used route between major activity centers.

However, times changed. The spread of the automobile, the increase of highways, and widespread suburbanization all contributed to the decline in demand for fixed-route systems. People were living farther apart from each other and driving their own cars more often, but the same expensive single mode systems continued to be maintained and built.

Bus routes were often not changed as mobility needs changed. As operating costs increased and ridership declined, it is not surprising that government subsidies for mass transportation grew rapidly after 1960. Even though the transportation environment and market had changed, many planners and managers of existing mass transportation systems continued to plan for the future using the system-based planning of the past. (See Illustration 1).

The under-utilization of these capital and labor intensive fixed-route systems and increasing road congestion led to serious financial and logistical problems. These problems finally caused a change in focus. Planners rediscovered that the mobility needs of the public are the only logical basis on which to plan publicly-financed transportation services.

A key to increased efficiency and ridership involves tailoring the design of transportation services to the needs of the intended users, and then making the users

Illustration 1a. Comparison of Design Approaches.

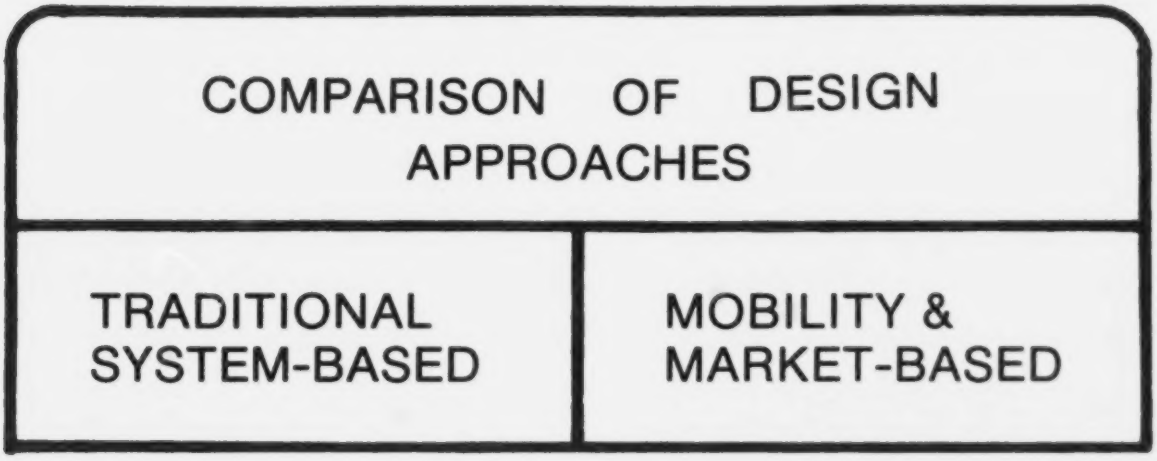


Illustration 1b. Comparison of Design Approaches.

	SYSTEM-BASED	MOBILITY/MARKET
CAPITAL	↑	⇅
MODES	FIXED, SINGLE	FLEXIBLE, MULTIPLE
OPERATORS	PUBLIC	PUBLIC & PRIVATE
CONTRACTS	LABOR ONLY	LABOR, USERS, PROVIDERS, & AGENCIES
FOCUS	THE HARDWARE	MOBILITY

aware of the service benefits. This type of marketing orientation leads to transportation design which is consumer-oriented rather than hardware-oriented and to planning methods which are needs-based rather than system-based.

Urban transportation problems require the efficient use of a variety of transportation modes and management techniques to meet a variety of mobility needs and transportation markets. Four major modal options are described in Illustrations 2a, 2b, 2c, 2d, and 2e.

Market Segmentation

> Market segmentation is an approach to transportation planning based on the identification and analysis of groups which are similar with respect to criteria that influence their travel choices.

In theory a market segment may be any size, but in practice it is critical that the size and number of semgents used facilitate the planning process. If too many small segments are used, data collection is almost impossible. If too few segments are used, it is impossible to determine the variety of needs in the community.

Illustration 2a. Transit and Paratransit Modes.

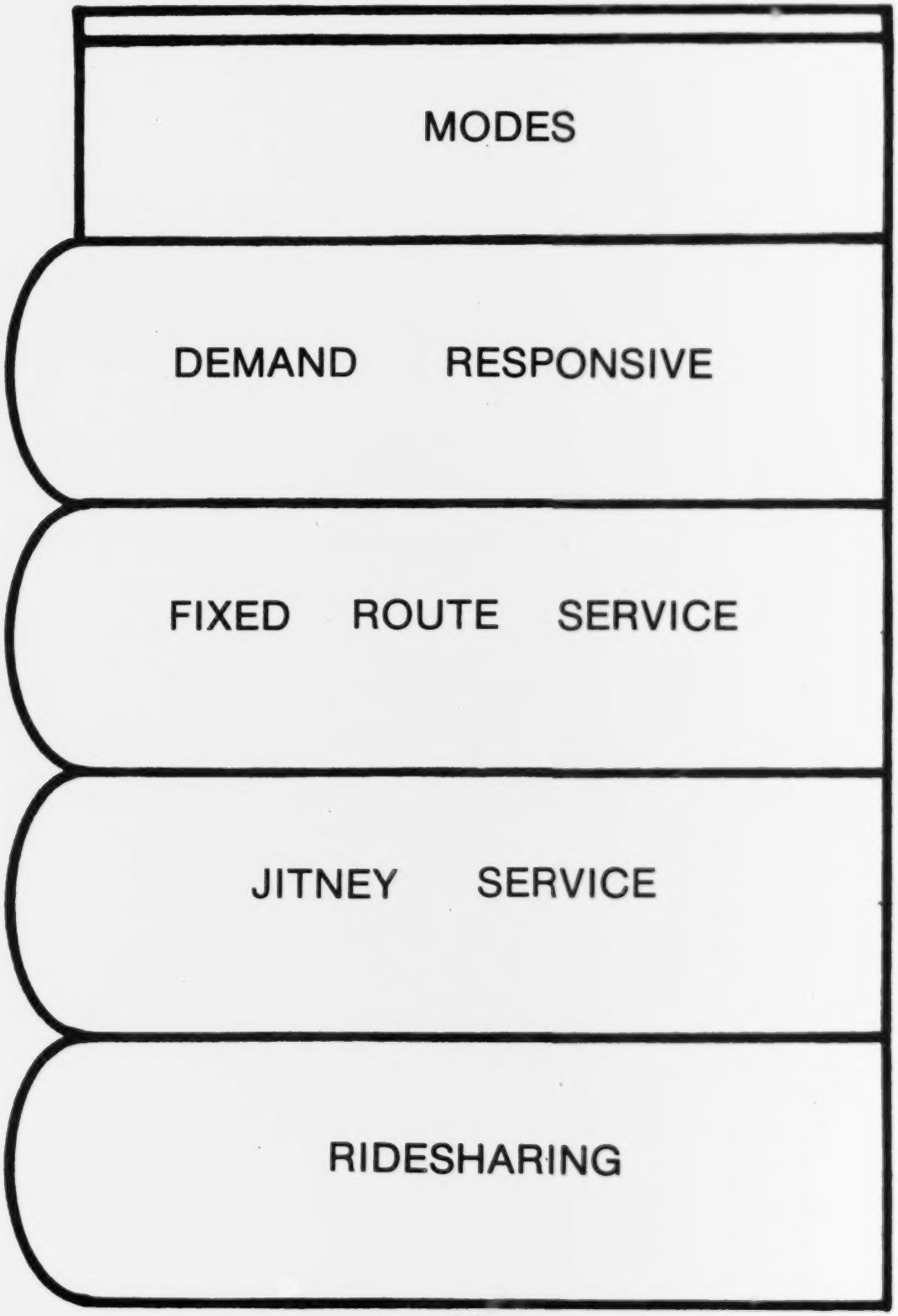


Illustration 2b. Transit and Paratransit Modes (cont'd).

MODE	CHARACTERISTICS	EXAMPLES
DEMAND RESPONSIVE	MEETS INDIVIDUAL SERVICE NEEDS	TAXI SERVICE
	DOOR TO DOOR SERVICE	DIAL-A-RIDE
	SERVICE TO ELDERLY & HANDICAPPED	SPECIAL PURPOSE VANS

Illustration 2c. Transit and Paratransit Modes (cont'd).

MODE	CHARACTERISTICS	EXAMPLES
FIXED ROUTE SERVICE	MOVES LARGE VOLUMES OF PEOPLE	BUSES
		LIGHT RAIL
	FIXED ROUTE & SCHEDULE	HEAVY RAIL

Illustration 2d. Transit and Paratransit Modes (cont'd).

MODE	CHARACTERISTICS	EXAMPLES
JITNEY SERVICE	VARIABLE SCHEDULE FIXED ROUTES PERSONAL STOPS ALONG ROUTE	MINI BUSES STATION WAGONS VANS

Illustration 2e. Transit and Paratransit Modes (cont'd).

MODE	CHARACTERISTICS	EXAMPLES
RIDESHARING	COMMUTER ORIENTATION LOW COST/QUICK RESULTS THIRD PARTY SPONSORS	CARPOOLS VANPOOLS SUBSCRIPTION BUS

For example, a group of workers at the Acme Factory who live in the same neighborhood may be considered as a small market segment due to shared travel characteristics including:

- travel at the same time;
- travel to the same destinations;
- similar availability and cost of transportation alternatives (private car);
- similiar incomes;
- concern with regular, on-time arrivals at work; and
- physical ability to drive, board buses, or walk to tranportation.

They might also share similar attitudes toward public transportation and automobiles such as a belief that driving alone to work is a symbol of personal independence.

In practice a group like this may be too small for planners to design a system around. However, the Acme workers themselves could always design and implement a carpooling arrangement to meet their needs more efficiently.

Market segmentation is an approach to planning for transportation rather than a solution to transportation problems. There are no solutions which solve the mobility and cost problems of every group's transportation needs. The use of the market segmentation approach, however, should provide data enabling citizens and planners to make more informed decisions.

Pittsburgh Case

In the mid-1970s many transit agencies installed wheelchair lifts on buses in an effort to provide equal access to conventional transit as required by current federal regulations. Such lifts added about $2,000 a year to the operating cost of a bus, yet studies show that such lifts were used less than an average of once a day per bus in every city where they were installed.

There were several major reasons why such lifts were rarely used:

- Many of the transportation handicapped found it difficult to get to bus stops;
- The buses often did not go where the people needed to go (such as doctor's offices); and
- The lifts broke down as many as 1 in every 6 times they were used between 1978 and 1980.

In Pittsburgh with its snowy winters and steep hills, it is often difficult for the transportation handicapped to reach bus stops. By dealing directly with the local handicapped community to determine their transportation needs, the Port Authority of Allegheny County realized that a less frequent but more convenient door-to-door service would be used more often by more people, and at a lower cost than lifts installed on fixed-route buses.

By using a market segmentation approach, the planners in Pittsburgh discovered that wheelchair lifts would not meet the major needs of their intended users before spending millions of dollars installing them. They then convinced federal planners to accept their logical, local solution based on a separate demand-responsive service. In this case, good needs-based planning prevented a costly error.

The ACCESS system currently provides door-to-door service to elderly and handicapped people in the Pittsburgh area. Vouchers are provided to eligible riders who use the services of taxi companies and social service agencies that have contracted with ACCESS to provide these services.

Miami Beach Case

The case of Miami Beach also illustrates the importance of studying market needs before introducing transportation innovations.

The city of Miami Beach is on a long thin island where a large population of elderly people live. In the late 1970's, its bus system consisted of a large number of bus routes which often overlapped on two main corridors between their lateral runs.

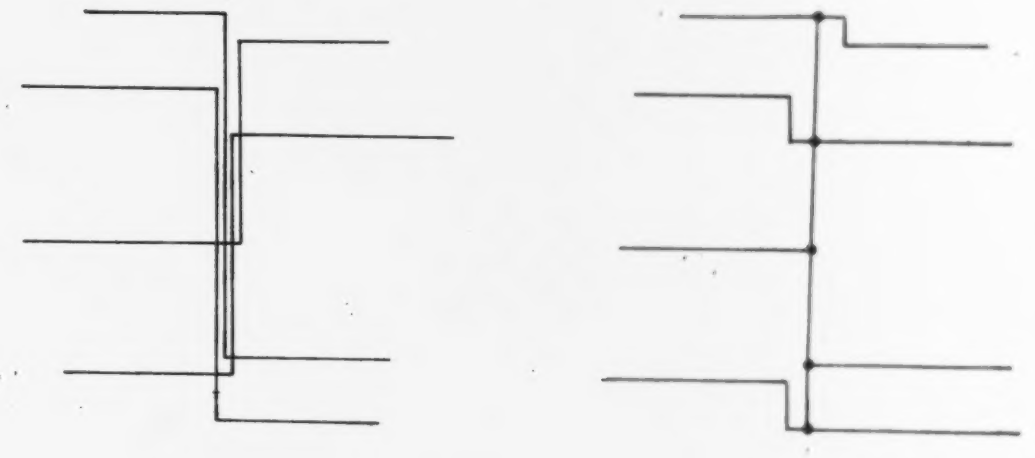
In 1979, it was proposed that Miami Beach switch to a more efficient corridor-based system designed around frequent express service along the corridor with transfers to local feeder routes. A simplified view of these route networks is included as Figure 3.

This plan was developed for its theoretical efficiency without consulting the largely elderly bus ridership about their needs. After implementation, the express line attracted few riders. As a result planners decided to meet publicly with the local elderly population. This group expressed their need for <u>direct</u> service with no transfers, rather than a faster, more frequent service requiring a transfer.

This experiment was cancelled in Miami Beach. Had the planners used a market segmentation needs-based approach, they might have discovered that Miami Beach was not a good location for this experiment <u>before</u> spending the time and effort to implement it.

By dividing actual and potential ridership into segments based on common travel characteristics and needs,

Figure 3. Miami Beach Project -- Simplified View of Bus Routes



planners can better match documented transportation needs with the most appropriate and cost-effective systems. This is the essence of market segmentation analysis. Planners cannot, however, decide which needs will take priority. This is a decision the community should make through its normal democratic processes.

Market Segmentation Planning

The use of the market segmentation approach to transportation planning involves four major steps:

1. Identification of market segments and determination of their needs;
2. Assessment of existing services;
3. Determination of unmet needs by the comparison of transportation needs and existing services; and
4. Design of systems targeted to needs.

In the next section we will look at sources of data which are used in the first step of this process--the identification of market segments and the determination of their needs.

DATA GATHERING FOR MARKET SEGMENTATION

The purposes of this section are:

- To show the types and sources of data necessary to determine market segments; and
- To explore the major methods of gathering data for market segmentation analysis.

The first step in market segmentation analysis involves the gathering of information related to the travel needs and characteristics of the people in the target region. Such information varies dramatically in its availability, cost, and usefulness. The planner must obtain the most relevant data with the most efficient expenditure of time and money.

The major types of information required to assess the transportation needs of various groups in an area are:

- Demographic information on the region;
- Data on the size of each market segment;
- Data on travel needs and characteristics of market segments;
- Data on travel attitudes and choices from national studies; and

- Information on local attitudes towards transportation issues and systems.

Gathering and analyzing these varied types of data is a complex task - there are no simple recipes for success. Data will vary in its quality and quantity. It is important to gather information from as many sources as possible to facilitate cross-checking and validation of estimates. It is also important to assess how the data was generated.

Sources of Data

Existing Records and Studies

United States government census data is extremely useful in transportation planning because it provides population breakdowns by ages, ethnic background, income, car ownership, and residential patterns for each census district. Because many of these factors relate directly to travel patterns, the census records are the first source which should be researched. However, census data is not usually up-to-date due to the substantial time delays in the release of the information. Similarly, local political records, available at town or city halls and county seats, contain information about the regional population organized by political districts.

Information on local growth and development trends and estimates of area-wide employment can often be obtained from the local Chamber of Commerce and city, county, and regional planning commissions. If a city has a population over 50,000, it should have available a federally supported comprehensive land use and tranpsortation plan which can be of enormous value. Estimates and future projections should be interpreted in light of their source and in comparison with other available information.

The transportation planner should ask local organizations for reports of previous studies of the area. These can provide usable information on transportation and other related topics. Local offfices of State Highway Departments and the Federal Highway Administration may also have available transportation studies of the area.

Estimates of the number of transportation handicapped people should be derived from census figures and checked against the records and estimates of social service agencies. In a similar way, it is possible to generate estimates of the transportation disadvantaged through records of school districts, public assistance offices, and analysis of census data. Data on commuters can be derived from the employment statistics of the area's larger industrial and commercial organizations.

Qualitative Information Sources

Assessing local attitudes towards transportation services requires more than just collecting existing data. Ideally, the entire regional population should be surveyed to determine individual travel patterns, preferences, and attitudes about public transportation. However, a simple questionnaire can easily cost $10 per person surveyed while telephone surveye can cost up to $50 per person..

Surveys require a large carefully selected sample group to produce reliable figures. For example, over 1,000 randomly selected people must be surveyed before the results are 95% valid within 3% of the overall population. Because of the cost of such large efforts, surveys are usually only administered to specific groups who share certain travel characteristics.

For example, large employers may be persuaded to assist in surveying their employees about commuting habits and willingness to ridershare. If the survey indicates interest in such a program, further information can be collected and ridesharing match-lists provided to the employees.

As in the example above, survey distribution and collection costs can be reduced or eliminated by enlisting existing institutions such as employers, churches, or

agencies. However, results of surveys administered to specific groups are applicable only to that group and cannot be used to generalize about the overall population.

Other important sources of data on travel patterns and preferences are interviews with local officials and directors of organizations such as employers, social service agencies, and transportation providers. The director of a center for the aged has firsthand knowledge of travel issues of concern to the center's elderly clients. Such information is valuable and involving these officials in the planning process can create a nucleus of support for the implementation of services proposed later.

General attitudinal data is available from existing national studies. For example, research has been conducted on attitudes and travel choices of commuters in Washington, DC. A sample of these results is included as Figure 4. Data from such in-depth studies can be extremely useful in planning the marketing mix of product, price, and promotion for a given service.

Figure 4

Results of Commuter Attitudes Study

Based upon observations of commuter demographics and attitudes, the study categorized commuters into five groups based on their attitudes towards ridesharing.

- The dedicated poolers. The believers who can be used to recruit other poolers.
- The marginal present poolers. Those commuters who may drop out easily or go in and out. This group poses a challenge to good pool matching and maintenance.
- The uninformed or passive potential pooler. Those commuters who are interested but do not know how to become involved or who are too passive to initiate the effort.
- The marginal anti-poolers. Those who need either to have greater incentives provided or particular disincentives removed.
- The dedicated opponent or confirmed solo drivers. Those who for either subjective or objective reasons are unlikely to rideshare at all.

Source: Misch & Margolin, cited in Homitz, Allen & Associates, 1981.

Summary

The planner must obtain the most reliable and extensive data with reasonable expenditures of time and money. This is possible because much local data has already been gathered and can be obtained at low cost if you know where to look.

Interviews and surveys are more time-consuming but are necessary to adequately assess the needs of different market segments. Another benefit is that gathering data firsthand helps locate sources of support for later proposals and is an essential part of the transportation marketing process.

STUDENT REVIEW AND INVOLVEMENT

1. Why is there traffic congestion in urban areas at certain regular times on weekdays. List and discuss reasons for this congestion and suggest possible solutions.

2. Give an example of someone who is:
   a. transportation handicapped
   b. transportation disadvantaged all day and night
   c. transportation disadvantaged only at night

3. How did needs-based planning save money in Pittsburgh? How could it have saved money in Miami Beach?

4. You are a transportation planner concerned about the tansportation needs and markets among the elderly. Conduct or stage an interview with the director of a large residence for the elderly. What are some of the topics you would wish to discuss?

5. Why is census data useful in transportation system planning? Find out where such data is available in your area.

6. Interview a transportation disadvantaged or transportation handicapped person about their travel needs and choices. Discuss possible new or modified public services with them.

GUIDELINES FOR STUDENT REVIEW

1. There are many reasons. They include:
   a. Workers travel at same time due to workplace schedules.
   b. Workers travel in same directions (to cities).
   c. Commuters choose to drive, usually alone.
   d. Public transit is neither available nor convenient for many work trips.
   e. Free (subsidized) parking is available at worksites.

2. See pages 5-9.

3. See pages 22-25.

4.
   - Where, how, and when do residents travel?
   - By which modes do they travel? Why are these modes chosen?
   - What opinion do residents have of public transit?
   - What transportation needs are not met?
   - Any ideas on how to meet the unmet transportation needs?

5. See page 28.

ANALYZING MARKET SEGMENTS

The purposes of this section are:

- To illustrate the critical factors in determining market segments; and
- To illustrate the process of constructing market profiles.

Market Segmentation Planning

The use of the market segmentation approach to transportation planning involves four major steps:

1. Identification of market segments and the determination of their needs;
2. Assessment of existing services;
3. Determination of unmet needs by the comparison of transportation needs and existing services; and
4. Design of services targeted to needs.

Figure 5 presents an overview of this process.

Figure 5. Market Segmentation Planning.

	Objectives:	Activities:
Market Segmentation Analysis	* who needs service * what services are needed * what criteria most influence travel choice	* research of public records * surveys of population samples * analysis of existing literature
Assessment of Existing Services	* what systems already exist (public and private) * how efficiently and effectively are existing systems performing	* analysis of distribution of existing systems * analysis of performance factors * determination of characteristics of existing systems and rider satisfaction
Analysis of Unmet Needs	* geographic service gaps * gaps in rider satisfaction * which existing systems can be better utilized	* analysis of market segmentation data * analysis of assessment data * comparison of market segmentation and assessment data
Targeted Design and Implementation	* how can existing systems be modified * what new systems are needed * what are the costs of modifications and new systems * what political and financial considerations must be accounted for	* design and costing of existing system modifications * design and costing of new systems * analysis of local political and financial concerns

Determining Market Segments

Determining market segments involves the identification and analysis of groups which are similar with respect to criteria which influence their travel choices. This permits the planner to identify areas of unmet needs which might be met by new or altered transportation services.

When designing a specific service, the planner should use the market segment data to identify the particular cluster of people within the segment who might use the proposed service. Further analysis can determine what mix of product, price, and promotion would induce these people to use the service and whether it would then be cost-effective in meeting their needs.

Travel Choice Criteria

There are many criteria which influence people to make choices about travel. They can be categorized into three major areas: trip purpose and nature; user's capabilities; and user's preferences.

Trip Purpose and Nature

This category of information includes the regularity of the trip, the time it is made, the starting and destination points, and how likely it would be to substitute an alternative mode for the private auto where one is used.

Analysis of this type of data might reveal a centrally located group of commuters traveling at the same times to the same general area. Later analysis may reveal that such a group could support a van or mini-bus service.

Capabilities of Users

Socio-economic conditions, physical handicaps, possession of driver's licenses, and car ownership are all significant factors in determining travel options and choices. This type of information might reveal a number of handicapped persons with no regular means of transport. Alternatively, research might reveal inner-city residents without cars to reach unfilled jobs in surrounding suburbs.

Preferences of Users

This information reflects modal characteristics considered desirable and undesirable by users and potential users. For example, a significant number of people might select an express service or would choose to ride buses if they were cleaner or air conditioned. Simple, low-cost changes in existing services can sometimes visibily increase system ridership, and, therefore, system efficiency. Data on preferences is also critical in the marketing of new or existing services.

Market Profiles

A market profile is a description of a market segment which indicates relevant needs, preferences, and

tendencies related to travel mode choice. Profiles for use by transportation professionals should indicate those aspects of peoples' travel patterns which have direct relevance to system planning and management.

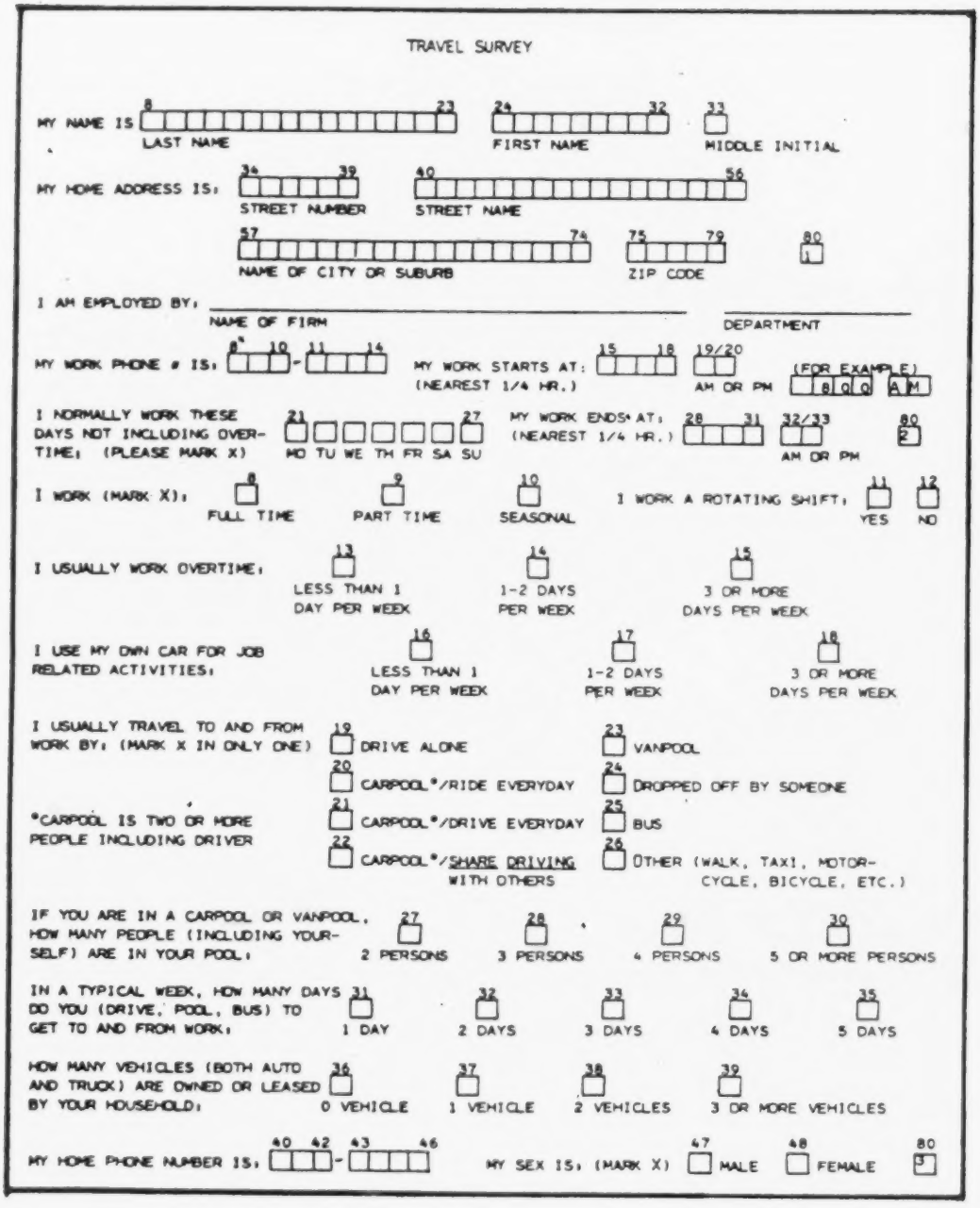
Preliminary grouping of people (commuters, shoppers, students, and others) can be useful in designing survey instruments and targeting groups for sampling. For example, commuters predictably travel to the same place each day while shoppers often do not. Therefore, questions concerning regularity and times of trips need to be designed for groups being surveyed.

Figure 6 is a travel survey designed for commuters. Note how the information being sought focuses on general commuter characteristics.

After a survey has been administered to enough people to ensure its validity, clusters can be determined by analyzing the data. These clusters can then be studied for specific potential services. In this case, ridesharing was pre-designated as a service option to be assessed for these commuters.

The following simulation illustrates the sequence of procedures used in defining market segments.

Figure 6. Travel Survey.


TRAVEL SURVEY
MY NAME IS
LAST NAME
FIRST NAME
MIDDLE INITIAL
MY HOME ADDRESS IS:
STREET NUMBER
STREET NAME
NAME OF CITY OR SUBURB
ZIP CODE
I AM EMPLOYED BY:
NAME OF FIRM
DEPARTMENT
MY WORK PHONE # IS:
MY WORK STARTS AT:
(NEAREST 1/4 HR.)
AM OR PM
(FOR EXAMPLE)
I NORMALLY WORK THESE DAYS NOT INCLUDING OVERTIME: (PLEASE MARK X)
MO TU WE TH FR SA SU
MY WORK ENDS AT:
(NEAREST 1/4 HR.)
AM OR PM
I WORK (MARK X):
FULL TIME
PART TIME
SEASONAL
I WORK A ROTATING SHIFT:
YES
NO
I USUALLY WORK OVERTIME:
LESS THAN 1 DAY PER WEEK
1-2 DAYS PER WEEK
3 OR MORE DAYS PER WEEK
I USE MY OWN CAR FOR JOB RELATED ACTIVITIES:
LESS THAN 1 DAY PER WEEK
1-2 DAYS PER WEEK
3 OR MORE DAYS PER WEEK
I USUALLY TRAVEL TO AND FROM WORK BY: (MARK X IN ONLY ONE)
DRIVE ALONE
CARPOOL*/RIDE EVERYDAY
CARPOOL*/DRIVE EVERYDAY
CARPOOL*/SHARE DRIVING WITH OTHERS
VANPOOL
DROPPED OFF BY SOMEONE
BUS
OTHER (WALK, TAXI, MOTORCYCLE, BICYCLE, ETC.)
*CARPOOL IS TWO OR MORE PEOPLE INCLUDING DRIVER
IF YOU ARE IN A CARPOOL OR VANPOOL, HOW MANY PEOPLE (INCLUDING YOURSELF) ARE IN YOUR POOL:
2 PERSONS
3 PERSONS
4 PERSONS
5 OR MORE PERSONS
IN A TYPICAL WEEK, HOW MANY DAYS DO YOU (DRIVE, POOL, BUS) TO GET TO AND FROM WORK:
1 DAY
2 DAYS
3 DAYS
4 DAYS
5 DAYS
HOW MANY VEHICLES (BOTH AUTO AND TRUCK) ARE OWNED OR LEASED BY YOUR HOUSEHOLD:
0 VEHICLE
1 VEHICLE
2 VEHICLES
3 OR MORE VEHICLES
MY HOME PHONE NUMBER IS:
MY SEX IS: (MARK X)
MALE
FEMALE

Source: Weisbrod and Eder, Evaluation of the Minneapolis Ridesharing Commuter Services Demonstration, June 1980

The New Office Complex Case

A city has a difficult traffic problem stemming from a recently completed office complex. Approximately 4,500 employees have begun working in this complex. Previously, many of them worked in small offices just outside the city. Others are new employees. Most of these employees have chosen to drive to work since few public services are available to them from outside the city. City planners estimate that more than 3,000 automobiles have been introduced into the downtown area, complicating traffic and causing severe parking problems.

Transportation planners decide to survey portions of the new downtown employees. They gain the cooperation of employers and administer preliminary questionnaires to 1,500 people. Information requsted through the questionnaire includes:

1. Regularity of travel,
2. Time of travel,
3. Work starting time,
4. Point of departure,
5. Work finish time,
6. Method of travel, and
7. Accessible modal options.

The Sample Survey Results are included as Figure 7 on the following page. With these results a planner can identify and analyze certain clusters within the market

Figure 7. Sample Survey Results.

Indicator	Description	Results	
1	Regularity of travel	Mon-Fri	1,350
2	Times of departure	6:30-7:00	220
		7:00-7:30	440
		7:30-8:00	560
		8:00-8:30	180
3	Work starting time	8:00 AM	700
		9:00 AM	740
4	Point of departure	North suburbs	335
		Greenville	180
		South Hills	280
		West Greenville	118
		Bordentown	105
		Other	430
5	Work finish time	4:00 PM	380
		4:30 PM	420
		5:00 PM	475
		6:00 PM	220
6	Method of travel	Private auto	1,120
		Public transit	205
		Rideshare	98
7	Available public transit	Public rail	115
		Public bus	280

segment. For example, questionnaires of workers arriving between 7:00 and 7:30 AM could be reexamined to identify and evaluate common departure points. This would indicate the feasibility of establishing a service such as a subscription bus or a ridesharing coordination program.

If there was a sufficient number of potential users with the appropriate trip purposes and times for a particular service, the planner would need to obtain data on the preferences of the potential users. A further survey might be conducted to determine the commuters' willingness to rideshare, and under what conditions.

This data could be used to assess the feasibility of the proposed plan to service the needs of workers at the new office complex. The data on commuter preferences is essential in determining the appropriate marketing mix of service (product), price, and promotion to make any new service as efficient and widely used as possible.

Summary

Determining the profile of market segments enables the planner to gain insight into the travel needs and choices of population segments. Any transportation service must meet the travel choice criteria of enough people to ensure system viability. Therefore, planners must use existing and new data sources to identify the actual needs and demands for transportation by various segments of the population before implementing any service innovations.

ASSESSMENT OF EXISTING SERVICES

The purposes of this section are:

- To descibe measures of existing service efficiency,
- To show how existing services are assessed in terms of an integrated planning framework, and
- To demonstrate how simple efficiency indicators are calculated.

Information on Existing Systems

Market segmentation analysis locates demand areas and indicates what types of service are desired. This information should then be compared with an assessment of existing systems to determine if the existing systems meet transportation needs and if they need modification. Secondly, the economic performance data of existing systems is used to help evaluate their efficiency and the feasibility of potential new or modified services.

Generally, the performance data of existing systems already exists. Transit planners need to obtain access to system budgets and related financial and service records. Also, since private carriers such as taxi and van services can play a role in paratransit, their operating capacities,

costs, and regions of operation, when available, should be included in this phase of planning.

Assessment Techniques

Transportation planners and managers need a working knowledge of the diverse, but interrelated, elements which comprise the transit network. Vehicle engineering, economics, legalities, market needs, market potential, and system performance are all components in this decision process. Assessment of services concentrates on system performance measurements and the resultant economics.

Basically, existing services are initially evaluated in terms of two questions:

1. What is the nature of the service being provided?
2. Is this service being provided in a cost-effective manner?

Operational Factors

The nature of existing services can be described in terms of what service is provided when, where, and to whom. Operational factors are those which are determined by management decisions. They include:

- fares,
- times of operation,
- routes or zones of operation,
- accessibility,

- headways,
- communication with users, and
- safety.

The transportation planner should also attempt to determine who uses the system. It is very important in the planning process to know which market segments use the system and at what times. This information can help in determining unmet needs in the area and in tailoring system characteristics to increase ridership.

System User Assessments

It is important to interview selected users of the system to obtain their opinions of the operational characteristics listed above. Factors such as the level of driver assistance or the availability of route information cannot be analyzed solely on the basis of written service and financial records. The planner should also ride the various services in the system regularly to augment other user assessments.

Assessments by system riders can help to identify both system strengths and problems which decrease ridership. In addition, user assessments are an essential element of market research and are an essential first step in efforts to promote ridership of new and existing services.

Economic Performance Factors

The impact of a system's operational factors is reflected in its ridership and in its economic feasibility. Many measures exist to determine the economic efficiency of a transportation system. Calculating these factors and analyzing the results permits the economic evaluation of systems as they exist and as they could be modified. Some of the most common performance indicators for a particular service are:

- vehicle cost per year,
- operating cost per year,
- ridership,
- cost per vehicle mile, and
- cost per passenger mile.

Computation of Performance Ratios

The following is an illustration of simple computations for basic performance ratios. The numbers are taken from Figure 8 which appears on the next page.

Computation of performance ratios from Figure 8:

Annual vehicle capital cost	=	cost of vehicle/expected useful life $127,870/10 years = $ 12,787
Operating cost:		The sum of non-capital expenses associated with vehicle operations including administrative and overhead $ 26,065

Figure 8: Hypothetical Data on Single Subscription Bus with Part-time Driver.

Annual miles	12,600
Average speed	25 mph
Labor cost/year/vehicle	$ 10,090
Fuel/year/vehicle	$ 1,512
Maintenance	$ 5,871
Insurance	$ 3,049
Administration	$ 5,392
Fees and Licenses	$ 151
Total Operating Cost (without capital)	$ 26,065
Vehicle cost/year	$ 12,787
Total cost	$ 38,852
Average occupancy per trip	31
Average capacity	53
Total round trips per year	250
Expected vehicle life	10 years

Ridership:		Average passengers per roundtrip multiplied by annual number of trips
		31 x 250 = 7,750 passenger roundtrips
Cost per vehicle mile (vehicle miles):		Total cost per year/total miles
		38,852/12,600 = $ 3.08
Cost per passenger mile:		(Total cost/year)/(passenger miles/yr)
Passenger miles/year =		(avg occupancy)x(number of trips)x (total miles/number of trips)
		OR
	=	(avg occupancy)x(total miles)
	=	31 x 12,600
Passenger miles/year =		390,600
Cost/passenger mile =		(Total cost/year)/(passenger miles/yr)
	=	$38,852/390,600
	=	$ 0.0996

The analysis of these results depends on the characteristics of the system studied. A demand-responsive service in wheelchair lift vans will cost more per mile to operate then the subscription bus described above. It is necessary to analyze as many indicators as possible in light of a system's operational characteristics to evaluate its economic efficiency.

In addition to the analysis of specific services, it is important to study the budget of the overall system so that possible inefficiencies can be identified and so that the incremental costs of proposed new or modified services can be estimated. Adding a supplemental service using a new van to a fleet of vans will cost less than adding the same

service and van to a fleet composed entirely of buses. Some of the affected budget categories would include maintenance, insurance, and administration.

Economic efficiency can only be assessed in the context of the system's operational demands and performance. One tool which can assist in understanding the relationship of various operational, demand, and economic factors is the concept of elasticity.

The Concept of Elasticity

The demand for public transportation is influenced by many factors including the level of fares, the quality and frequency of the service provided, and other factors outside a planner's control. Elasticity is a concept used to describe the relationships between various features of a transportation service and the demand for it as expressed in ridership.

Elasticities are derived from observed changes in ridership and are estimated from cross-sectional (market segmentation and service analysis) data during the planning of transportation services and service modifications. They may be used to estimate ridership for a replacement service that involves only moderate changes in service quality or to estimate ridership response to proposed changes in an existing service.

Elasticity of demand is a ratio of the percentage change in demand (ridership) divided by a percentage change in a service characteristic such as fares.

For example, if fares are increased from 50 to 60 cents and ridership decreases from 2,000 to 1,900 then:

Point Elasticity =

% change in ridership/ =

% change in price

- 5.0%/ =

+20.0%

-.25

Therefore, when prices increase by 20%, ridership decreases by 5%, giving a fare elasticity of demand of -.25%. Therefore, a 1% fare increase would theoretically result in a ridership decrease of .25%. The discussion above represents the simplest formula for fare elasticity. More deailed and reliable calculations are beyond the scope of this unit.

The fare elasticity of demand is a useful concept in transit fare planning since it indicates the responsiveness of ridership groups to fare changes. For example, experience has shown that off-peak, short-distance, and shopping trips are more responsive to fare changes than

peak-period, long distaance, and work trips. The larger the absolute value of the fare elasticity, the more responsive the group. Off-peak riders with a fare elasticity of -0.60 are more responsive to fare changes than peak riders with a fare elasticity of -0.30.

An important rule of thumb with fare elasticities is that if the elasticity calculation results in a value less than -1.0, a revenue loss will result. In this instance, demand is said to be elastic. If the result is greater than -1.0, a fare increase will increase total revenue, and demand is said to be inelastic.

As discussed above, elasticity can be used to estimate ridership changes resulting from increases and decreases in fares. Recall, however, that ridership is affected by many factors - headways, safety, reliability, etc. - in addition to fares. Changes resulting from a fare increase may be offset by improvements or changes in service. For example, in 1979 Honolulu established a prepaid bus pass program which, in combination with other factors, helped reduce the impact of a simultaneous $.25 fare increase for frequent riders. As a result the system did not experience any noticeable reduction in ridership.

The application of elasticities in planning transportation services is unfortunately not straightforward for a number of reasons. First, so-called typical elasticities found in standard reference sources are based on fare and

service levels, and changes in those levels, observed during the 1960s and 1970s. As a result, they should be used with caution in estimating current responses to conditions that will vary radically from conditions typical of those decades.

Second, many typical elasticity values do not reflect differences between people in different parts of a region or service differences within a region. Third, the elasticities presented in tables are largely based on changes in regular bus route service, and they may not be applicable to paratransit and other modes of service. For example, ridership response to a change in wait times may be less for a dial-a-ride service than for a fixed-route sevice because riders can wait at home.

Elasticity can play a useful role in assessing the relationships between various operational, demand, and economic factors related to a public transportation system. However, as with all concepts, it must be employed with caution when used to predict the future.

Summary

The second phase of a market-based transportation planning process is the assessment of existing services. The operational and economic characteristics of existing public and private transportation systems should be analyzed to determine at what cost and in what manner service is being provided in a given area. It is also important to assess the responsiveness of existing service users to changes in service levels and fares through the use of elasticity data.

ANALYSIS OF UNMET NEEDS

The purposes of this section are:

- To show how needs and services are compared to determine areas of unmet needs, and
- To illustrate the types of unmet needs which may be discovered.

Market segmentation analysis categorizes the population into groups according to their needs and preferences, and estimates the sizes of such groups. Assessments of existing services evaluate the ridership, location, operating performance, and economic feasibility of existing systems.

A comparison of the data on market segments and existing services will reveal areas for improvement in the transit network of a given city or region. Unserved needs uncovered by this comparison can be interpreted in a variety of ways depending on the nature of the system, its users, and local priorities.

Forms of Unserved Needs

Service gaps can appear in several forms, among them: specific trip demand, special user groups needs, and unserved geographic areas.

Specific Trip Demand refers to transportation needs which begin and end at specific locations at regular times. Commuter work trips are the most common example of spcific trip demand but this category also includes travel by groups of people to any organized activity such as a concert, fair, or sports event. It is often a straightforward process to design services for such specific markets. Often, the type and size of vehicle can be selected according to the characteristics of the specific trip to be provided, and the times and route of travel are predictable.

For example, in one suburb, 45% of the workers were found to be driving alone to the same train station every morning along the same two lane road. If one-quarter of these people would ride a convenient feeder service, then congestion and the cost of travel would be reduced for all of the commuters on that route. In another example, downtown merchants were invited to underwrite a free shuttle bus on game days to a major college football stadium to increase their business. This relieved both parking and congestion problems.

Special user groups are primarily the transportation disadvantaged and the transportation handicapped. They can have needs for specific types of transportation service. People with certain disabilities may need specialized service or the availability of vehicles with special equipment. The key issue is whether different groups of people have access to viable transportation services.

In fact, transit properties are required to make every reasonable effort to provide transportation service to all people in their communities in order to receive federal support. Examples of services which can meet the needs of special user groups include lift-equipped buses, demand-responsive systems such as dial-a-ride, and user-side subsidies provided to certain groups.

The transportation planner must investigate the size, nature, and needs of special user group needs before proposing new or modified services. A simplified description of this process is presented in the example at the end of this section.

Unserved geographic areas should be identifiable from local transit maps and survey data. However, lack of transit service is relative. An elderly person in a neighborhood where she fears street crime may feel that she is unserved if the bus does not stop within 200 yards of her residence while her college age grandson may think little of walking a mile to a busstop to reach his classes.

Unserved neighborhoods can lie within or outside the boundaries of the public transit network. In many cases, survey data can be used to determine whether there is sufficient ridership to support the extension of an existing fixed-route system, or to support a paratransit option.

Quality of Service

Quality of service can be considered an unmet need if, for example, unclean buses discourage potential riders from using public transportation. By improving bus maintenance, ridership could be improved and the system could function more efficiently while meeting more needs. Similarly, low-cost actions such as repainting or new maps may produce measurable ridership and revenue improvements.

Market research such as surveys and interviews can be useful in identifying how aesthetic and other service quality factors are perceived by potential riders. Negative quality factors can be investigated to determine if service quality increases are feasible and cost-effective. Factors that the public views positively can be utilized as part of the system's promotion.

Identifying Unmet Needs: A Simulated Example

Tracy Planner analyzed transportation markets and needs in her city as the first step in an overall process of assessing current, modified, and potential new services.

Her research indicated that there were roughly 6,000 transportation disadvantaged elderly people in the city.

By investigating further she found that roughly 2,500 people lived on the south side of the city and roughly 3,500 lived on the north side. She assessed the existing services available to these people and found that a local social service agency for the elderly provided a meal service and a limited dial-a-ride service on the south side. The north side was being served by two of the city's bus routes, but the stops were far from many homes and near places where the elderly feared street crime.

Tracy noted the unmet transportation needs of 3,500 elderly transportation disadvantaged people on the city's north side. She then conducted surveys and meetings with members of this group to verify her estimates and to investigate their needs further.

Possible solutions to be designed and assessed during the targeted design step would include:

- rerouting existing buses;
- incorporating the local agency into a city-wide coordinated dial-a-ride service; and
- providing the group with user-side subsidies in the form of scrip for discounted taxi rides.

Summary

Determining unmet needs requires analysis of market segments and of existing system data. Needs and demands for public transportation service are compared with data on the operational performance of existing services. Planners can then identify unmet needs and evaluate potential new and modified services. Mobility needs can be of several types including specific trip needs, special user needs, and geographic needs. Unmet needs can also take the form of inadequate quality of service on existing systems. Only after unmet needs have been identified can new and modified systems be designed and assessed.

STUDENT REVIEW AND INVESTIGATION

1. Figure 9 on the following pages shows two employers being considered for a ridesharing campaign. Why is employer #2 a better candidate than employer #1?

2. You know that 8,000 transportation handicapped people live in a 10 square mile area and you are considering initiating a Dial-A-Ride service using lift-equipped minibuses. List several ways you would try to determine if, and under what service conditions such a system would be used by members of this group.

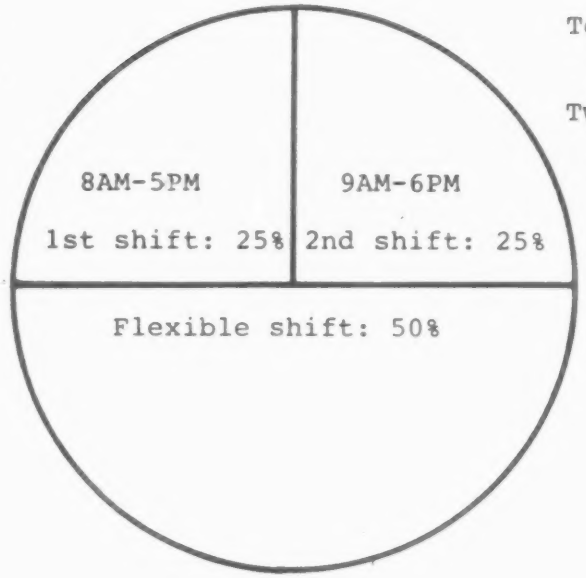
3. Using Figure 10, calculate:
   a. annual ridership
   b. cost/vehicle mile
   c. cost/passenger
   d. cost/passenger if ridership increased to 50% of capacity

4. Compare the figures obtained from Question 3 with those calculated previously for the subscription bus service. Why does the DRT service have lower ridership/capacity and higher costs/passenger?

5. Find an unmet transportation need or demand in your area and interview a person affected by it. Report your findings to the class and discuss possible services which could meet the need.

Figure 9. Comparison of Employee Ridesharing Feasibilities.

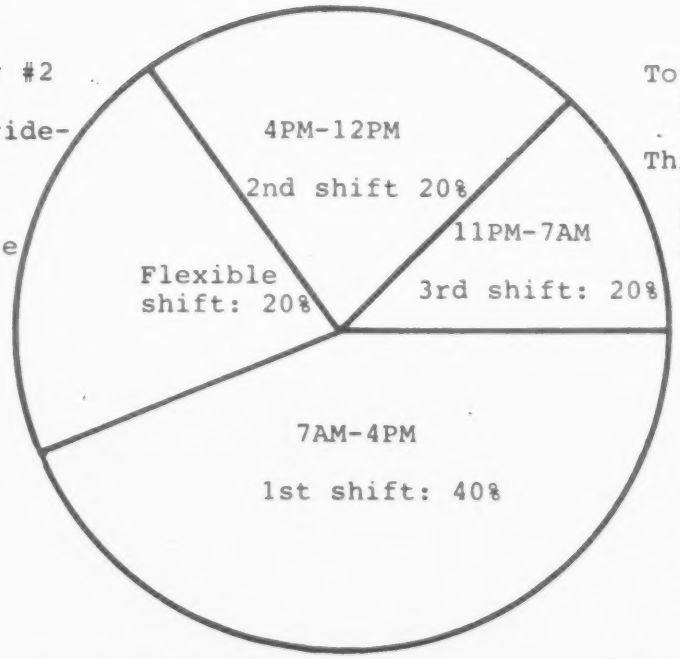
Employer #1: a poor ride-sharing candidate



Total Employment: 100

Two Clusters:
1st Shift--25
2nd Shift--25

Employer #2 a good ride-sharing candidate



Total Employment: 1000

Three Clusters:
1st shift--400
2nd shift--200
3rd shift--200

SOURCE: Demetsky, et al., Decision Procedures for Paratransit Market Selection and Service Evaluation, p. 14.

Figure 10:
Hypothetical Data for a DRT Van
with 2 Full-Time Drivers

ANNUAL COSTS

Labor	$ 31,874
Fuel	$ 3,600
Maintenance	$ 7,200
Insurance	$ 1,740
Administration and Dispatching	$ 20,720
Fees & Licenses	$ 240
Total Operating Cost Without Capital	$ 65,374
Capital (Vehicle)	$ 3,840
Total	$ 69,214
Annual miles	30,000
Avg. Occupancy per hour	2.4
Capacity of Vehicle	12
Hours of Operation per year	3536

GUIDELINES FOR STUDENT REVIEW

1. Employer #2 has 3 clusters of at least 200 workers each traveling to the same place at the same time every day. Each of these groups could probably find ridesharing opportunities. Employer #1 has 2 clusters of only 25 workers traveling at the same time to the same place. Obviously the opportunties for matching residence locations are far more limited for Employer #1.

2. Some methods include:
   a. survey the potential users,
   b. meet with organizations of the handicapped,
   c. meet with social service agencies who serve this group,
   d. ascertain handicapped accessibility and use of existing systems, and
   e. visit other cities offering similar service and compare population characteristics and ridership.

3. Annual Ridership 8,486
   Cost/Vehicle Mile. $2.31
   Cost/Passenger $8.16
   Cost/Passenger at 50% capacity . . . $3.26

4. The DRT service has a lower ridership/capacity and higher costs than a bus pool in part because in the DRT system:

a. each passenger is picked up at an individual time and location
b. each boarding requires time;
c. the vehicle must follow a separate route for each passenger;
d. the vehicle has its fixed costs divided by a far lower capacity; and
e. the DRT system has high administrative costs associated with the scheduling and routing of the vehicle and management of fares.

5. To continue this discussion, discuss the political and financial feasibility of implementing the solutions proposed for particular needs. Would they be utilized and cost-effecive, or would they be inefficient and costly?

TARGETED DESIGN

The purposes of this section are:

- To describe the process of system design and selection in the context of overall planning,
- To discuss the political implications of system design and implementation, and
- To illustrate system design and the process of implementation.

The design and implementation of transportation services must be done in direct response to specified needs and preferences of potential users. As it has been determined by virtually all demonstration and pilot projects (those that succeeded and those that failed), unless a service meets the individual needs of riders, it will not be used. It should not be assumed, however, that design and implementation of modifications and new systems are simple.

Practical and logical considerations must be placed alongside hard data before solutions can be proposed.

Proposed solutions must then be place alongside financial and political factors to assess the realistic probability of implementing such solutions. It is necessary for transportation planners to have a working knowledge of related institutions and issues and to understand the impact of their work on the entire community. (See Figure 11 and Illustration 3.)

Factors for Design

Needs-based planning provides design parameters for new systems and the criteria for improving existing systems. The determination of these characteristics and criteria is made by analysis of market segmentation and assessment data.

The factors which emerge as most influential in final design are:

- Segmented needs and demands for transportation services,
- The size of individual segments,
- The location of unserved groups, and
- The economic feasibility and characteristics of modes and vehicles.

Recommendations for system design and modification require consideration of logistic, technical, economic, and social factors. That is to say, final design is a complex process. What follows is a brief summary of these factors.

Illustration 3. Principal Groups Involved in the Transportation Decision-Making Process.

Source: Technology Sharing, 1978, p. 29.

Figure 11. Principal Groups Involved in the Transportation Decision-Making Process.

GOVERNMENT	CITIZEN GROUPS	BUSINESS COMMUNITY
Local	Advisory Boards	Chamber of Commerce
County	Fraternal Organizations	Developers
Metropolitan	Howmowners	Labor Unions
Regional	Individuals	Merchants
Special District	League of Women Voters	Newspapers
Transportation Authority	Neighborhood Groups	Taxi Companies
State Department of Transportation	Parent Teacher Associations	Transit Operators
Other State A-95 Agencies	Peace Groups	
Federal Department of Transportation	Religious Groups	
Other Federal Agencies	School Groups	
Law Enforcement	Service Clubs	
Public Safety Agencies		
Welfare		
Health Agencies		

SOURCE: Technology Sharing, 1978, p. 29.

Logistic - determining an optimum number of vehicles; the best routing patterns; and the combination of modal options to serve the most needs in the best way.

Technical - the operating efficiency of individual vehicles; special needs modifications, such as lifts and ramps; required maintenance equipment and training.

Economic - the capital cost of investment; start up costs; operating costs; expected income from fares; and sources of funding.

Social - what groups will benefit from new service; what is the economic impact of new services; and what social and personal needs are to be met.

Factors for Implementation

Financial resources are generally limited and subject to political factors. Therefore, planners must organize the raw data and make recommendations according to:

1. How can the range of needs be met?
2. What is the cost of meeting each of these needs?
3. What needs should take priority over others?
4. What is the potential for system implementation within the local political context?

Political Factors

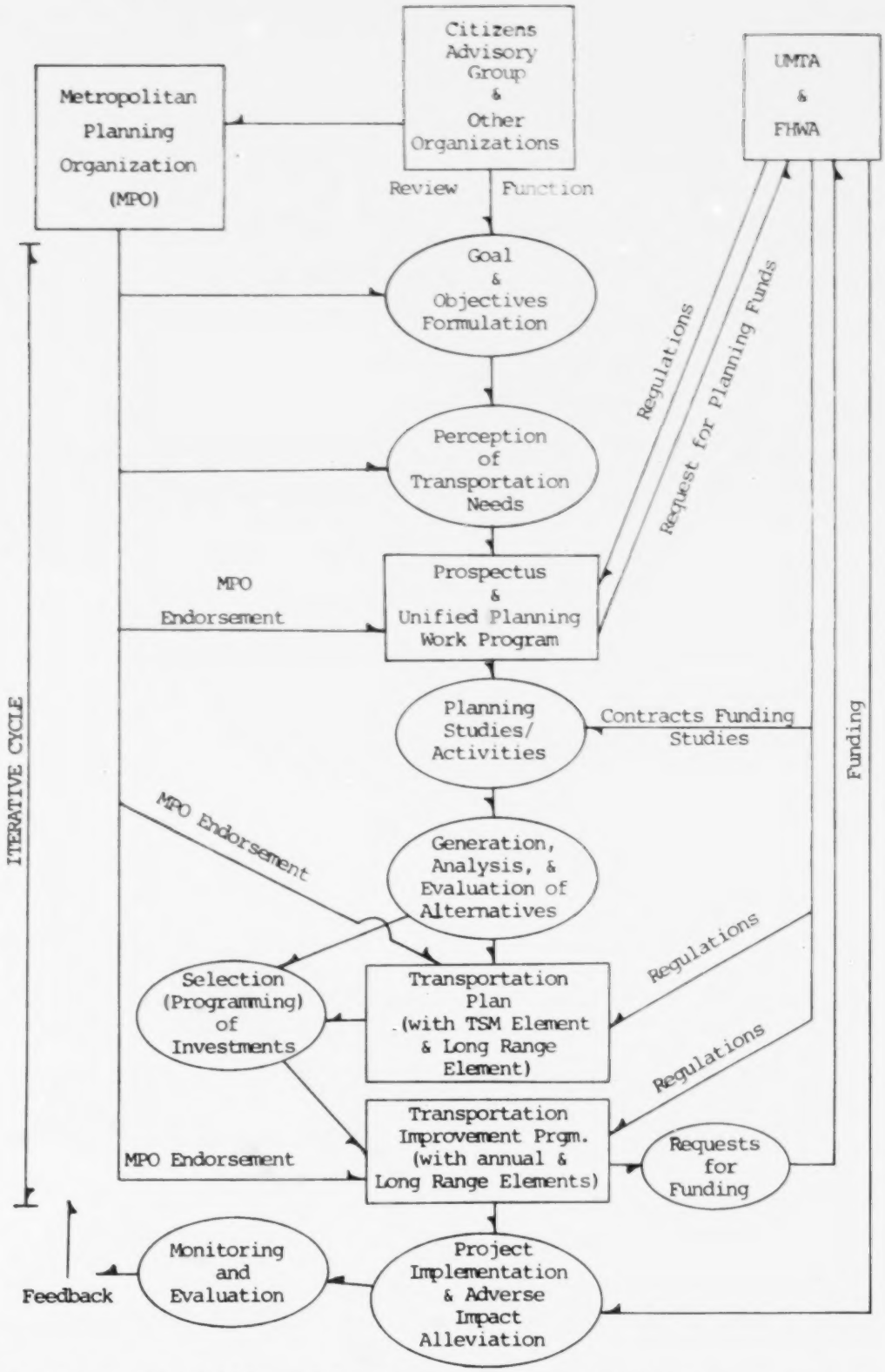
Transportation planners and managers work within social and political systems, so proposed changes are not always

easily implemented. Many parties have a stake and an interest in public transportation services. These include the transit rider, the transit worker, the taxpayer, the downtown employer, the motorist, and so on. All have different interests, perspectives, and methods.

Transit workers are justifiably concerned about their work conditions and financial compensation. Taxpayers are equally justified in their concerns about the benefits they will derive from their tax dollars. Transit riders wish to see transit services which will better meet their individual needs and downtown merchants are interested in attracting shoppers to their stores. Often systems cross jurisdictional boundaries further complicating political decision-making as each jurisdiction is concerned that it receives a reasonable service for its financial contribution.

The actual process of obtaining federal funding for public transportation systems is long and complex as illustrated by Figure 12. As discussed above, potential modified or new systems will be scrutinized by any number of interested parties. The nature of this process makes it mandatory to develop political support for new transportation systems <u>during</u> the initial planning process and not wait for a finished plan before assessing its political feasibility.

Figure 12. Planning Process to Obtain Federal Funding.



SOURCE: Taxis, The Public and Paratransit: A Coordination Primer, 1978, p.78.

Even sympathetic local governments will alter the most carefully researched systems design in order to meet other priorities. The following simplified case illustrates how systematic planning was used to determine design characteristcs and how this design was then fit into an overall financial and political framework.

The Case of Santa Fe, New Mexico

In 1977 the Mayor of Santa Fe, in response to community requests, appointed a Public Advisory Committee to undertake a needs-based transportation planning project for the city. The results of the planning steps are summarized below.

Market Segmentation Analysis was conducted from analysis of census data and from surveys. Some of the major conclusions of this analysis were that:

1. 14.7% of total household in Santa Fe did not own a car (as compared to a national average of 13%).

2. In 7 of the 12 census tracts, more than 40% of the population was 18 years of age or younger; in half of the tracts, 13-30% were 60 years or older.

3. 57% of the telephone survey respondents indicated a willingness to pay additional taxes to finance public transportation services.

4. 7% of telephone respondents indicated their household had a handicapped member; 62.5% of these people indicated that the individual's disability caused severe transportation problems.

5. 64% of telephone survey respondents and 58% of the community rated public transportation at least of equal importance with other municipal services.

Personal interviews with leaders of community organizations revealed:

- that taxi service was inadequate in Santa Fe;
- a percieved need for public transportation and the belief that citizens would support a transit system;
- opposition to a city-operated system; the predominant view was that service should be provided by a private operator with assistance from the city; and
- that service for the elderly and the handicapped should be the number one priority.

Assessment of Existing Services revealed that:

- taxis were the only means of transportation for the general public, and that from 1975 to 1978 the total number of cabs had decreased from 11 to 4;

- all other transportation services were restricted to specific clientele and were of limited size.

Analysis of Unmet Needs was conducted by comparing the assessed needs with existing services. Given the low level of existing service, the planners were basically able to assume that all needs for public transportation were essentially unmet. Thus, they noted the major areas of such needs which included:

- low-income residents;
- carless residents;
- the elderly;
- the young; and
- the handicapped.

In addition, they noted the large percentage of local residents who believed Santa Fe needed a form of public transportation.

Targeted Design based on the previous planning steps was conducted. The first step was for the Committee to prioritize the transportation needs in order of importance. This basically involved community political priorities rather than any considerations of transportation systems. The top five priorities were, in order, the handicapped, the disadvantaged, the carless, the elderly, and commuters.

With their priorities clear, the Committee began to consider specific alternatives which included:

- Fixed-Route Bus Service - a city-owned system available to the public at a standard fare;
- Dial-A-Ride Service - city-owned shared-ride vehicles providing door-to-door service on demand; and
- User-Side Subsidy - fare discounts to specific groups using privately-operated shared-ride taxi services.

The fixed-route bus service would have been of little use to the top-priority handicapped segment because it was not door-to-door. Given the lack of any local taxi fleet to contract out a user-side susbsidy program, the Committee selected Dial-A-Ride as its top priority and submitted its choice to the city.

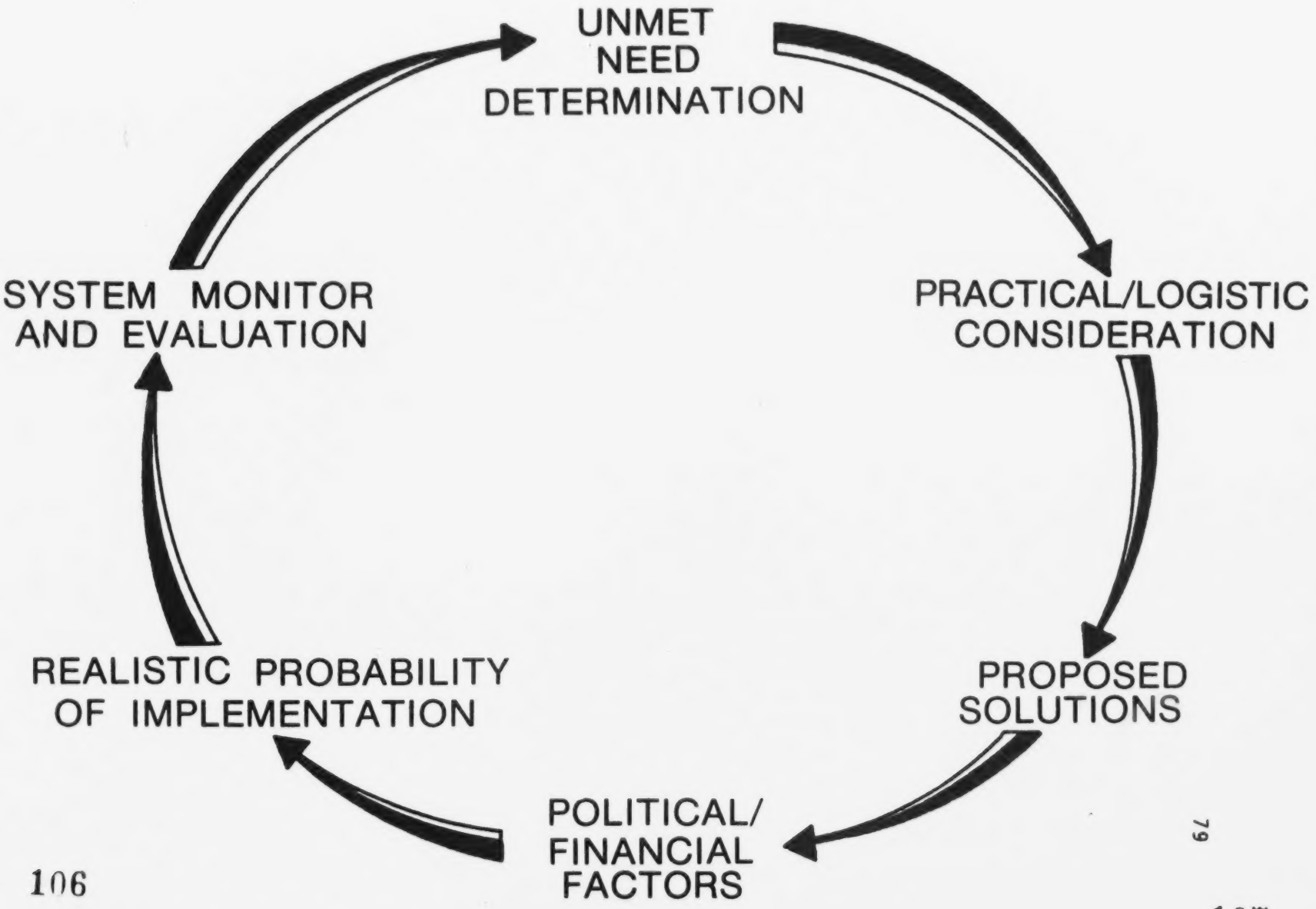
However, the city chose the user-side subsidy program because it was far easier to start than buying a fleet of vehicles. The administrative and financial investments were far less and the proposed operating costs were similar. But what about the lack of taxis? The city recruited and contracted with a large taxi company to begin operations in Santa Fe under the new program.

Summary

Targeted design is a two-phase process. The planner must first design transportation options based on local needs, existing systems, and cost effectiveness. At the same time, the political and fiscal environments must be continuously assessed to determine the feasibility of implementing the resulting proposals.

Neglecting either of these phases will lead to failure, while attention to both will not guarantee success. The complexity and difficulty of transportation management is clearly revealed by attempts to implement new services or alter existing ones. Illustration 4 shows how system planning is a continuous process which does not conclude just because an innovation is implemented.

Illustration 4. Transportation Planning Process.



REFORMS FOR EXISTING SYSTEMS

The purposes of this section are:

- To illustrate methods used to market existing transportation services.
- To illustrate methods of relieving congestion by modifying the transportation environment to favor high-occupancy vehicles (HOVs).

Meeting Transportation Services

Ideally, the marketing of a transportation service is integrally connected with a needs-based planning model. The results of market segmentation analysis should provide the planner with information on the segments which are actual and potential users of a given service. Their preferences then determine the marketing mix of product, price, and promotion for that service.

Often, a planner is faced with an existing service which is judged to be underutilized. Marketing considerations are an important factor in the overall decision to modify, promote, or eliminate the service. These decisions are made by comparing market needs,

existing service assessment, and potential new services. Figure 13 illustrates how specific service modifications might be employed to respond to specific factors limiting ridership.

One tool for determining whether or how to modify existing services is the demand elasticity calculations discussed earlier in this unit. As an example, studies in New York and London have been found that show fare elasticity for bus travel was twice as large during off-peak hours as during peak hours. Thus, ridership was far more sensitive to price during the less busy off-peak periods in part due to the different segments which ride buses at those times. Such analysis is one of the reasons why many transit systems now have lower fares during off-peak periods.

Promoting Existing Services

After decisions on service modifications are made, the planner must turn to the promotion element of the marketing mix. To market transportation, a planner must consider the factors which influence people to use it. Factors in modal choice include:

Figure 13. Marketing Strategies for an Existing Bus Service.

CONSUMER COMPLAINTS	MANAGEMENT PROBLEM	MARKETING TECHNIQUE
Bus routes are too confusing.	Information Barriers for Consumers	Computerized Rider Information Systems New System maps
	Routes are complicated.	Route restructuring
Paying exact change is too inconvenient.	For security, drivers cannot make change.	Prepaid bus passes Commuter pass programs Credit card prepayment for passes
It costs too much.	Running buses is extremely expensive. Riders must pay part of cost.	Lower costs with: management improvement, automated data systems, articulated buses Publicize comparative cost of driving. Increase ridership through promotion.
Same fare for long trips to suburbs as for short downtown trips	Congestion caused by too many automobiles in downtown area results in slow bus movement.	Off-peak fares Free central business district service Transit malls Auto-restricted zones Zone-based fare system

DEFINITIONS:

An articulated bus has two segments and is bigger than a regular bus.

A transit mall is a street where only transit vehicles and pedestrians may go--no cars.
A transit mall is a type of auto-restricted zone.

- Cost;
- Available Destinations;
- Comfort;
- Waiting Time (Headway);
- Travel Time;
- Personal Attitudes; and
- Scheduling Flexibility.

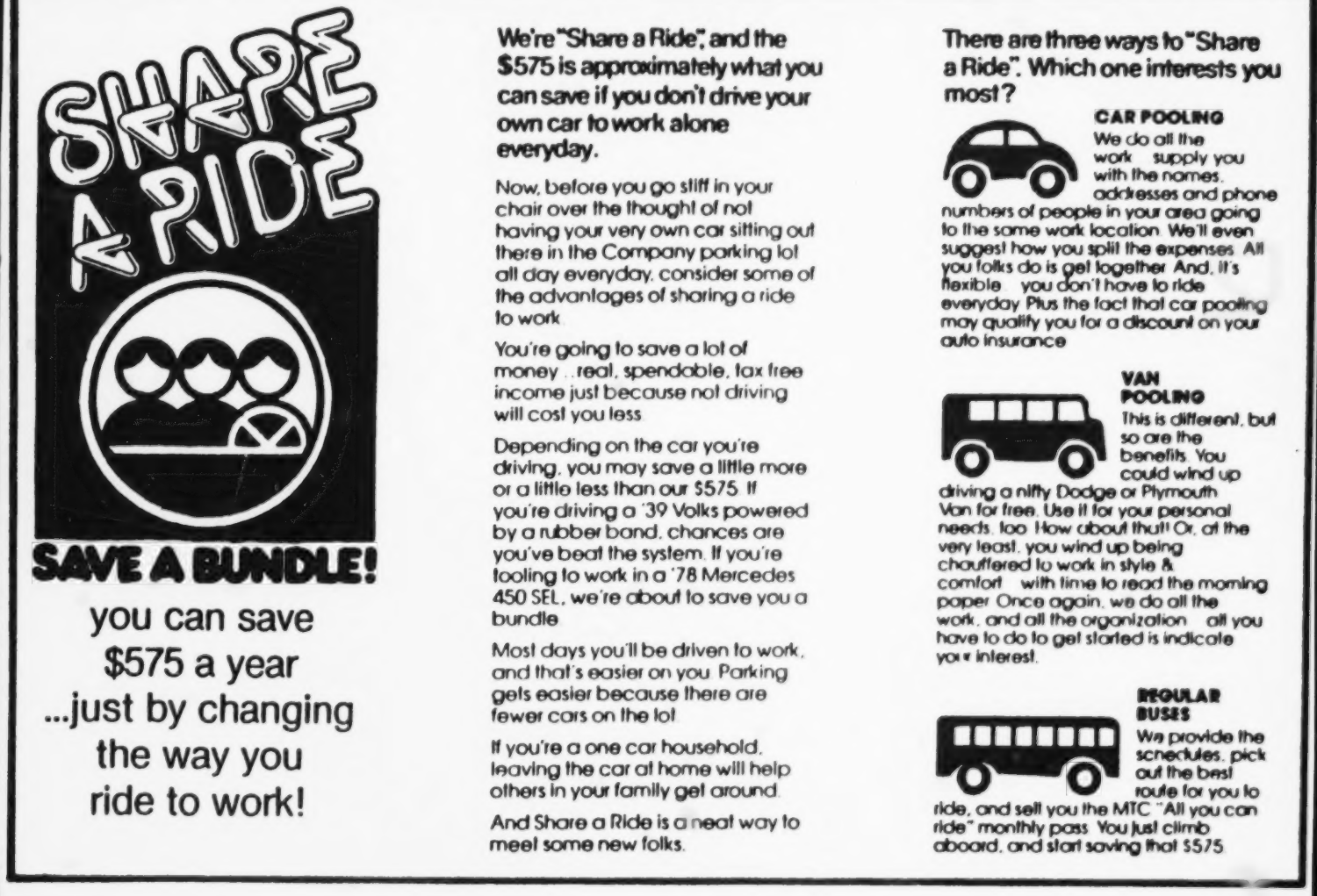
Promotions should be based on knowledge of the potential riders the system wishes to attract and should generally stress service quality related to the above modal choice factors. Promotions for transit services should use multiple media channels and should be coordinated to influence rider's modal choices. A sample brochure used to promote a ridesharing service is included as Figure 14.

Modifying the Transportation Environment

Congestion is a problem in urban areas which affects all modes of travel. It causes higher costs, more pollution, and decreased societal efficiency. For example, buses often make only one trip at rush hours due to congestion. A less congested road network could allow buses to double their service and revenue with only slightly increased costs during this period.

The major cause of congestion and the major waste of transportation capacity is the solo driver. As a result, many transportation systems managers have taken action to

Figure 14. Sample Ridesharing Promotional Brochure.


SHARE A RIDE
SAVE A BUNDLE!
you can save $575 a year ...just by changing the way you ride to work!
We're "Share a Ride", and the $575 is approximately what you can save if you don't drive your own car to work alone everyday.
Now, before you go stiff in your chair over the thought of not having your very own car sitting out there in the Company parking lot all day everyday, consider some of the advantages of sharing a ride to work.
You're going to save a lot of money . . real, spendable, tax free income just because not driving will cost you less.
Depending on the car you're driving, you may save a little more or a little less than our $575. If you're driving a '39 Volks powered by a rubber band, chances are you've beat the system. If you're tooling to work in a '78 Mercedes 450 SEL, we're about to save you a bundle.
Most days you'll be driven to work, and that's easier on you. Parking gets easier because there are fewer cars on the lot.
If you're a one car household, leaving the car at home will help others in your family get around.
And Share a Ride is a neat way to meet some new folks.
There are three ways to "Share a Ride". Which one interests you most?
CAR POOLING
We do all the work . . supply you with the names, addresses and phone numbers of people in your area going to the same work location. We'll even suggest how you split the expenses. All you folks do is get together. And, it's flexible . . you don't have to ride everyday. Plus the fact that car pooling may qualify you for a discount on your auto insurance.
VAN POOLING
This is different, but so are the benefits. You could wind up driving a nifty Dodge or Plymouth Van for free. Use it for your personal needs, too. How about that! Or, at the very least, you wind up being chauffered to work in style & comfort . . with time to read the morning paper. Once again, we do all the work, and all the organization . . all you have to do to get started is indicate your interest.
REGULAR BUSES
We provide the schedules, pick out the best route for you to ride, and sell you the MTC "All you can ride" monthly pass. You just climb aboard, and start saving that $575.

Source: Evaluation of the Minneapolis Ridesharing Commuter Services Demonstration, 1980, p. A-3

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modify the transportation environment to encourage the use of high-occupancy vehicles (HOVs). High-occupancy vehicles are generally considered to be those with three or more passengers.

Encouraging Use of HOVs

The greatest problem caused by solo drivers is increased rush hour congestion. Planners have tried to alter the transportation environment to discourage people from driving alone during these periods. Usually, this is done by giving HOVs some type of preferential treatment.

This policy is based on the fact that road space should be allocated by person movement and not by vehicle movement. On Madison Avenue in New York City, buses carry 60% of the daytime travelers but represent only 8% of the vehicles. By allocating more space to buses, the person-capacity per hour of the street is increased and the majority of road users travel more quickly and efficiently. This is an example of how designated HOV lanes are used on a downtown street.

Special lanes for HOVs have also been set up on highways, at freeway ramps, and at toll booths. In some European cities, buses can even signal ahead to alter traffic light timing.

Another method of encouraging the use of HOVs is to restrict automobile use in areas of the city with transit malls and other auto-restricted zones. Also, parking policies can be made tougher. Many cities have banned on-street parking in parts of their central business district and reallocated the space for commercial, transit, or pedestrian use.

Transit malls and HOV lanes are controversial because of the trade-offs involved. More than half the workers in the U.S. drive alone to work and many dislike waiting in lines while carpools and buses whiz by. An HOV lane project was cancelled in Los Angeles after implementation due to political pressure from solo drivers. Enforcement of HOV roadways and lanes has also been a costly and difficult problem in some instances.

Summary

Reforming any existing system is difficult due to the conflicting interests involved. Each proposed change requires careful planning of operational, promotional, and political considerations. Whether marketing an under-utilized existing service or restructuring the transportation environment to encourage HOV use, it is the transportation manager's job to investigate and propose efficient options which may then be implemented through normal political processes.

CONCLUSIONS ON MARKET SEGMENTATION

The purpose of this section is:

- To summarize the major characteristics of the market segmentation approach to transportation planning.

Market Segmentation is an approach to transportation planning based on the specific transportation needs of local people. The concept of market segments comes from the need to analyze a wide spectrum of transportation users to determine subgroups which share similar characteristics or needs. By analyzing these needs, planners can design systems which are efficient and useful.

Some major market segments are commuters, the transportation handicapped, and the transportation disadvantaged. Each group is made up of subgroups with similar travel characteristics. By studying the needs and preferences of market segments, planners can avoid implementing costly systems which will not be used. This point has been demonstrated in both Pittsburgh nd Miami Beach.

The use of the market segmentation approach to transportation planning involves four major steps:

1. Identification of market segments and the determination of their needs;
2. Assessment of existing systems;
3. Determination of unmet needs by the comparison of transportation needs and existing services;
4. Design of system targeted to needs.

The identification of market segments and their needs is often accomplished by gathering data from a variety of sources which include:

- census data;
- regional and local planning data;
- social service agencies;
- community leaders; and
- surveys.

Each segment is examined on the basis of its travel choice criteria which depend on trip purposes and nature, and user's capabilities, and user's preferences.

The segment is profiled and then clusters within the segment can be identified based on their potential use of a specific proposed or modified service. Surveys are

extremely useful in determining consumer preferences. In this way planners can decide if a proposed service will meet the travel choice criteria of enough users to ensure its viability.

Existing services are assessed on two main questions:

1. What service is being provided when and to whom?
2. Is this service being provided in a cost-effective manner?

The first question may be answered by studying the operational characteristics of the system such as fares, hours, and routes. The second question requires analysis of such economic performance ratios as cost/passenger and subsidy/passenger.

Unmet needs are analyzed by comparing market segment data with the assessment of the existing services. Unmet needs are of several types: specific trip needs, special user needs, and geographic area needs. Inadequate service quality on an existing system is another type of unmet need. After unmet needs have been identified, new and modified systems can be designed and assessed.

Targeted design involves two critical phases. Transportation options must be planned on the basis of local needs, existing systems, and cost-effectiveness. At the same time, the political and financial environments

must be constantly monitored to determine the probability of implementing specific proposals.

Marketing is a critical part of transportation planning and management. Analysis of market segments helps target where promotional money should be spent in addition to its use in modifying service characteristics. One way of improving public transportation service is to improve the transportation environment by favoring high-occupancy vehicles. This can be an effective, if controversial, way to reduce congestion for all transportation users.

Needs-based transporttion planning is essential to assist society in the most efficient use of limited public funds. It cannot solve our transportation problems, but it may help us achieve better mobility for more people than no planning at all.

STUDENT REVIEW AND INVESTIGATION

1. Albert Bussy designs a transportation system which he feels offers his city an ideal mix of service, cost, and geographic coverage. By working alone, he has completed the plan in record time; and he presents it immediately to a city council meeting. He is surprised with the opposition he meets since he feels his analysis was thorough and his conclusions obvious. What critical mistakes do you think Al made in his planning process? Why might you suspect that his plan is not as sound as he thinks?

2. Describe your impressions of typical peak-period bus riders and off-peak riders. Why do you think the latter group is more sensitive to fare changes?

3. Susan Trandeal is a new administrator who decides to start a bus system in her county. She knows several members of the county commission and first persuades them to buy ten minibuses for her system. Later, she has numerous problems routing the buses and some routes attract few, if any, riders. System deficits soar and her politician friends end up paying a large annual sum of money in the form of operating subsidies. What advantage did Susan have over most transportation planners, and how did this become a liability?

4. If there is a bus service operating near you, imagine some ways in which it could be better marketed. Refer to the chart Marketing Strategies for an Existing Bus Service.

5. Do you think it is fair to give special privileges to high-occupancy vehicles? Why?

6. Interview a local political leader about the public transportation system in your area (or the need for one). Discuss how the system is funded and what public needs it meets. Interview the director of the system and discuss the same questions. Report to the class.

GUIDELINES FOR STUDENT REVIEW

1. He ignored community input and political factors. Sound public policy planning is not often a result of working alone.

2. Peak-period riders are primarily commuters and can usually afford a fare increase if it means timely arrival at work. Off-peak riders may not have jobs and may not need to ride the bus that day. Thus, if fares increase, more of the off-peak riders find an alternative.

3. Her advantage was the political credibility to ensure local funding, but it became a liability when she used it to purchase vehicles <u>before</u> assessing the needs of county residents.

5. Some arguments on HOV preferences are:

FOR	AGAINST
1. Allocate roads for <u>people</u> movement not <u>vehicle</u> movement.	1. People should be able to drive cars wherever there's a road.
2. Decrease congestion & the resulting wasted time, pollution, & gas.	2. Enforcement costs & problems.
3. Aid public transportation.	3. Unfair to solo drivers.

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APPENDIX A: BIBLIOGRAPHY

Abbreviations to be used in this bibliography:

DOT	Department of Transportation
FHA	Federal Highway Administration
NTIS	National Technical Information Service
OSMD	Office of Service and Method Demonstrations
TRB	Transportation Research Board
TRR	Transportation Research Record
TSC	Transportation System Center
UMTA	Urban Mass Transportation Administration

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